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THE

VOYAGE OF H.M.S. CHALLENGER.

ZOOLOGY—VOL. XXIX.

TEXT—FIRST HALF.

REPORT

ON THE

SCIENTIFIC RESULTS

OF THE

VOYAGE OF H.M.S. CHALLENGER

DURING THE YEARS 1873-76

UNDER THE COMMAND OF

CAPTAIN GEORGE S. NARES, R.N., F.R.S.

AND THE LATE

CAPTAIN FRANK TOURLE THOMSON, R.N.

PREPARED UNDER THE SUPERINTENDENCE OF

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AND NOW OF

JOHN MURRAY, LL.D., Ph.D., &c.

ONE OF THE NATURALISTS OF THE EXPEDITION

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CONTENTS.

REPORT on the AMPHIPODA collected by H.M.S. CHALLENGER during the years 1873–1876.

By Rev. THOMAS R. R. STEBBING, M.A.

FIRST HALF.

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EDITORIAL NOTE.

The collections of Amphipoda procured in the trawls, dredges, and tow-nets during the voyage of H.M.S. Challenger were placed in the hands of the Rev. Thomas R. R. Stebbing for examination and description in the summer of 1882. From not long after that date up to the present time Mr. Stebbing has been almost exclusively occupied in the work connected with the preparation of this extensive and valuable Report, which will be welcomed by all students of the Crustacea.

There is the same uncertainty connected with the Amphipoda as with several other groups of animals taken in the trawls and tow-nets, as to the depths at which the specimens were captured. Some were undoubtedly taken at or near the bottom, while others were as certainly taken in the surface and subsurface waters, but with others again there is a great deal of doubt. Although a record of the depths to which the nets were let down was attached to the specimens, the naturalists of the Expedition did not intend to convey the impression that the specimens necessarily came from the depths indicated.

This Report, which forms Part LXVII. and Volume XXIX. of the Zoological Series of Reports, consists of 1774 pages of letterpress, with 212 Plates and a Map. The whole is bound up in three separate portions. two of letterpress and one of Plates.

The first Instalment of the Manuscript was received by me on the 5th December 1885, and the last on the 30th November 1888.

John Murray.

Challenger Office, 32 Queen Street
Edinburgh, *December* 5, 1888.

THE

VOYAGE OF H.M.S. CHALLENGER.

ZOOLOGY.

REPORT on the Amphipoda collected by H.M.S. Challenger during the Years 1873–76. By the Rev. Thomas R. R. Stebbing, M.A.

PREFACE.

It will easily be understood that the various portions of this Report have not been prepared without a considerable amount of laborious perseverance. Even points of slight importance, such as the derivations of generic names, have involved no little expenditure of time and toil, and (as with those names for which no derivation has been found) sometimes most trouble has been taken where the result is least satisfactory. Considering that the earlier pages were printed off before the work represented by the later pages had shed its light upon them, the Report is unlikely to be wholly free from deficiencies, inconsistencies, and other faults and mischances. In the completed volume it may well happen that many of these will be far easier to detect than they were to avoid. But, whatever the defects that may actually exist, either in the descriptive part of the Report or in that which deals with the literature of the subject, I venture to suppose that they might have been fewer had all the writings taken into account been always at hand to be referred to, compared, and pondered over whenever occasion required, while I am sure that they must have been far more numerous, had I not fortunately met with the different forms of assistance which I now desire most gratefully to acknowledge.

The ready and courteous liberality with which the Royal, the Linnean, and the Zoological Societies of London, the Royal Society of Edinburgh, and the Advocates' Library, place their rich stores of literature at the service of the student, has laid me,

no doubt in common with many others, under a deep obligation. My earnest thanks are also due to my personal friends, Mr. Spence Bate, the Rev. Canon Norman, and Dr. Murray, the Editor of the Challenger Reports, for the uncommon generosity with which they have allowed me to borrow from their libraries, and retain, not for weeks only, but in some instances for years together, rare and costly books and pamphlets. For the loan of valuable books or papers I am indebted likewise to Professor Alphonse Milne-Edwards, to Mr. W. E. Hoyle, of the Challenger Office, to Mr. Edward Saunders, of Lloyds, and to one or two other friends. Nor must I forget the friendly and unsparing zeal with which both Mr. Hoyle and Mr. James Chumley, of the Challenger Office, have assisted me in my book-borrowing career.

For favouring me with one or several or all of their contributions to the literature of the Amphipoda I have to thank a large number of gentlemen: in Great Britain, C. Spence Bate, G. Herbert Fowler, E. J. Miers, A. M. Norman, David Robertson, W. Baldwin Spencer, and A. O. Walker; on the Continent of Europe, Carl W. S. Aurivillius, Th. Barrois, Jules Bonnier, Carl Bovallius, Edouard Chevreux, A. Della Valle, Adrien Dollfus, Henri Gadeau de Kerville, Jules de Guerne, H. J. Hansen, R. Koehler, W. Lilljeborg, G. Pfeffer, G. O. Sars, J. Sparre Schneider, and August Wrześniowski; in the United States of America, Walter Faxon and S. I. Smith; in Australia, W. A. Haswell; in New Zealand, Charles Chilton, T. W. Kirke, and G. M. Thomson. To the kindness of Professor S. I. Smith and Mr. E. J. Miers I am under a special obligation, since, when the first sets which they had sent me of their valuable papers had been destroyed by an accident, they generously and to my great convenience repeated their gifts.

In obtaining the biographical dates, given where possible in connection with the notice of each author's earliest work on the Amphipoda, I have received much kind assistance from Professor G. O. Sars, Professor S. I. Smith, and Mr. W. E. Hoyle.

For various specimens of Amphipoda I wish cordially to thank Dr. Bruce, of the Military Hospital, Malta, Mr. Charles Chilton, of Dunedin, New Zealand, Mr. W. A. Haswell, of the University of Sydney, Australia, Canon Norman, of Burnmoor Rectory, Fence Houses, Mr. David Robertson, of Cumbrae, Scotland, Herr Conservator J. Sparre Schneider, of Tromsø, Norway, Professor S. I. Smith, of New Haven, Connecticut, U.S.A., Mr. G. M. Thomson, Rector of the High School, Dunedin, New Zealand, and Mr. A. O. Walker, of Chester. For purposes of comparison with the Challenger collection, as well as for throwing light upon frequent doubts which the literature of the subject suggested, many of these specimens were of great importance. Some proved in actual fact extremely useful, and almost all might have been of the highest service had not the pressure imposed by the limits of time forced me too much to neglect them.

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INTRODUCTION.

Bibliography.—In literature the age of the Amphipoda scarcely reaches back beyond a century and a quarter. Linnæus knew almost nothing about them. At least, in one of his descriptions he is shrewdly suspected of having mistaken the head of the animal for its tail. Of particular species, it is true, earlier writers, such as Friderich Martens the ship's barber of Hamburg, had formed fairly accurate conceptions. In the middle of the sixteenth century Rondelet figured a specimen, but perhaps, like Linnæus two centuries later, without clearly knowing at which end of the creature to look for its head. Nearly two thousand years before Rondelet it is surmised that the keen glance of Aristotle had noted the existence of this tribe of diminutive shrimps, but his observation, though it throws a venerable prestige over their scientific record, did nothing to awaken any fruitful interest in their character and distribution. The institution of the genus *Gammarus* by J. C. Fabricius in 1775 presently brought the Amphipoda together as a group, although naturally it was due to earlier labours that any necessity for grouping was perceived. During the next forty years these Crustaceans no longer suffered from the neglect which had previously left them obscure. When Latreille, in 1816, gave them the name Amphipoda, an important stage was marked in the growing knowledge and interest about them. Since then they have received a very ample measure of attention, and at the present day they are studied in many parts of the world with great skill and evident enthusiasm. Of the literature of the subject numerous lists have been published, among which that by the late Axel Boeck in 1872 is the most important. He arranges in alphabetical order the names of one hundred and fifty authors, giving the titles of their contributions to the number in all of two hundred and seventy-three. This catalogue extends to the year 1871. A separate chronological review of the literature is carried down only to the year 1855. This part of Boeck's work is especially valuable for the comments which his large knowledge of the subject enabled him to supply. He intimates, however, that his comments are chiefly concerned with northern species. For dealing properly with the almost cosmopolitan Challenger collection it seemed indispensable to verify, and as far as possible to complete, the review which Boeck had so admirably begun. Neither the difficulty of the task nor the prodigious bulk of the material result was at first foreseen. From folio to pamphlet a vast mass of literature had to be consulted. How much borrowing of

books and buying of books, how many journeyings to and fro, how many researches ending in nothing, are necessarily involved in such consultation, those who have had a similar experience will well know, and those who have not had it can scarcely be made to understand. Without therefore expatiating on the difficulties which I suppose myself to have conquered or on the difficulties which conquered me, it may suffice to mention that, as the record proceeded, the plan of it was more than once changed, the earlier notices being rewritten and expanded, under the influence of a growing desire that as much of the task as possible should be done once for all and need no second doing. In the form actually adopted, the titles of works are given in chronological order, so far as the year of publication is concerned, but within that year they for the most part follow the alphabetical order of the authors' names.[1] Accuracy in the dates given has been anxiously aimed at, seeing that without this accuracy it is sometimes impossible to determine those questions of priority on which scientific nomenclature so much depends. But precision is very difficult to arrive at, when the only available copy of a work is an undated extract from a foreign magazine, or from the proceedings of a learned society, read in one year and published in the next or the next but one. It is greatly to be wished that "separate copies" should not only have the true paging, as Darwin[2] urges, but that they should also have that date of publication from which the new genera and species contained in them have a claim to reckon their priority.

The title of each work mentioned in the Bibliography is accompanied, it will be seen, as a rule by some notice of its contents. There are a few exceptions, where papers, of which the titles could be cited on adequate authority, have remained inaccessible, or where the titles themselves seemed sufficiently suggestive without further comment. Here and there, like a sign-post with the legend "No Road" upon it, the title of a book has been given for the sake of saying that it contains nothing about the Amphipoda. On the other hand some obscure works, perhaps really bearing on the subject, are omitted from the general list and only incidentally referred to as occasion offered. In the notices taken collectively two special objects have been aimed at :—

1. To quote the original definition of every genus of the Amphipoda.
2. To give under its proper date the name of every new species.

Two objects of a more general character have also been kept in view, namely, first, to give some idea of the character of the information which the various writings supply, and secondly, in so doing to produce a record, after the annalistic method, of the progress of knowledge in this branch of natural history.

It will be readily understood that a generic definition as at first framed is often little

[1] The following names are exceptions to the alphabetical order on the pages mentioned:—Seba, Linnæus, p. 18; Linnæus, p. 20; Strøm, p. 28; Olafsen, p. 36; Ginnani, Hammer, p. 38; Fabricius, p. 40: Pallas, p. 41; Forskål, p. 43; de Quéronic, p. 47; Linnaeus, p 53; Roemer, p. 55; Pallas, p. 65; Latreille, p. 71; Rafinesque, p. 87; Leach, p. 89; Pollini, de Blainville, p. 93; Leach, p. 107; Costa, Krøyer, p. 177; Kraus, p. 205; Bate and Westwood, p. 340; Gerstaecker, p. 342; Cunningham, p. 404.

[2] The Life and Letters of Charles Darwin, edited by his son, Francis Darwin, vol. iii. p. 141.

suited for the purposes of later classifications, yet each remodelling requires to be tested by that earliest form which is here reproduced. While every definition has been given which claimed to refer to a new genus, references have also been made, wherever available, to authorities who have disputed the claim of novelty, or to other reasonable grounds for rejecting the defined name. When the type-species is well known, and specimens of it have been examined by more than one competent observer, the true position of a genus is comparatively easy to determine. But sometimes the solitary specimen on which a genus was founded has since been lost or destroyed or damaged past recognition. In some of these cases the genus remains either absolutely obscure or only the sport of ingenious guesses. It would be convenient if some limit of time could be established, so that after fifty or a hundred years the names which no one had been able to identify throughout such a period should lose their right of priority.

With species, as with genera, all that have ever been published as new ones are admitted to the record. So far the task is simple. But here too an attempt has been made, by references and suggestions, to guide the reader through the labyrinth of synonyms. This part of the work is full of perplexity and complication, and the labour here bestowed upon it can pretend to little more success than that of having drawn into one view a large number of problems still requiring solution. Conjectural determinations for or against the validity of a species, apart from observation of the actual specimens described, must be accepted with much reserve even from the most experienced writers; for example, a consensus of important authorities had long referred Kroyer's *Stegocephalus inflatus* to Phipp's earlier *Cancer ampulla*, yet in 1887 Hansen decides that Kroyer's species is after all distinct. But the very fact that mistakes are so often made in the attempt to regulate synonymy should at least have the useful result of awakening attention to the extraordinary amount of trouble caused by vague and inadequate descriptions, especially when these are given without explanatory figures of the object described.

In the general treatment of the large mass of literature here brought under review I have desired as much as possible to save trouble to any naturalist who might in the future have to deal with a collection similar to that which is the subject of this Report. Hence brief notices of the Amphipoda and descriptions of single species embalmed in large works have been quoted in full, and occasionally for the same reason short separate treatises have received a longer notice than their intrinsic importance, apart from their rarity, would have demanded. On the other hand, some works, such as the British Sessile-Eyed Crustacea by Bate and Westwood, and Boeck's great work on the Arctic and Scandinavian Amphipoda, have been only briefly noticed, since they are already widely known and of necessity in general use, so that the enormous space required for an exhaustive discussion of their contents would have been to a great extent needlessly absorbed. Among the writings of the last century, attention should, I think,

be called to the superiority which Pallas displays in his descriptions of Amphipoda. In the present century Kroyer can have but few rivals for combined fulness and accuracy of detail. In the whole multitude of contributions to the voluminous literature here considered, it is obvious that some writers have done more harm than good, or that, to speak in the most lenient terms, their productions are of no value whatever; but while this can be fairly said only in rare cases, the examples are very numerous of fruitful industry and high scientific excellence. Without, however, any attempt to appraise seriatim the merits and services of this host of writers, it may be convenient to mention a few works which the student will find, if not indispensable, at least of foremost value, for particular branches of the subject. Thus, for the general structure of an Amphipod, he should certainly consult the Histoire Naturelle des Crustacés d'eau douce de Norvège, by G. O. Sars, 1867; for embryogeny, the Mémoire sur la formation du Blastoderme chez les Amphipodes, les Lernéens et les Copépodes, by E. van Beneden and E. Bessels, 1869, and Ulianin's Essay, 1881; for the circulation of the blood, the papers by Wrześniowski, 1879, and Delage, 1881; for the family of the Cyamidæ, the contributions of Lütken, 1873 and 1887; for the Caprellidæ, Mayer's Die Caprelliden, 1882, to which an Appendix is to be presently published; for the Phronimidæ, Claus' Essay, 1879, and for the Platyscelidæ, the same writer's work of 1887; and to this list the treatise by Bovallius on the Amphipoda Hyperina, and that by Wrześniowski on the subterranean Amphipods, when completed, will doubtless need to be added. For the study of the Amphipoda Gammarina the works of importance are so numerous that it might be misleading to point out a few as more prominently essential than the rest, yet on the difficult subject of the Œdiceridæ the paper by J. Sparre Schneider in 1883 ought not to be overlooked.

Classification.—The division of the Amphipoda into three groups, the Gammarina, Caprellina, and Hyperina, has been long and widely accepted, and is followed in this Report as of practical utility and based on reasonable grounds. Geology is unfortunately almost silent about these Crustacea. To all intents and purposes there have been as yet no fossil Amphipods discovered.[1] If, nevertheless, we may assume the three groups to have been all derived from a common ancestral form, then the evidence of the groups themselves may be taken to show that the Gammarina and Caprellina, by their similar mouth organs, are more nearly connected with one another than either with the Hyperina, and that the Hyperina, in respect of their mouth organs, are furthest removed from the primitive form, inasmuch as their maxillipeds have lost that resemblance to modified legs which is so striking in the other two groups. From both the Gammarina and the Hyperina the Caprellina are separated by the slight development of the pleon. This character can be readily explained as an acquired adaptation to their habits of life. If the suggestion be made that the ample pleon might as well have been developed from

[1] See pp. 111, 118, 276, 300, 353, 409, 471, 486.

the feebler form as the feebler have been degraded or reduced from the more ample, the answer is this, that the impoverished condition attributed to the pleon in the Caprellina is correlated to other appearances of degradation in the same group, that no Caprelline stage has ever been observed in the embryos of the other two groups, and that the strongly developed pleon would scarcely have been so general, not only among Amphipods, but also in the neighbouring orders of Crustacea, had the ancestral form been nearest to the rudimentary one. Hence it appears to be a natural arrangement to place the Caprellina after, though next to, the Gammarina, and to let the Hyperina come last.

To any one glancing over the great variety of forms presented by different species of Amphipoda, and comparing an *Orchestia* with a *Cystisoma*, a *Rhabdosoma* with an *Anonyx*, a *Pariambus* with a *Gammaracanthus*, it might seem extremely rash to assume that all the Amphipoda could possibly have a lineage in common. But after prolonged examination of homologous parts the observer would not be so much impressed with the difficulty of a common descent as with the intrinsic simplicity of the processes by which these wonderful differences of structure might have been produced. For if a son may be taller than his father, a daughter stouter than her mother, in the same family one child have straight hair and another curls, one brother be smooth and the other a hairy man, variations of a corresponding kind suffice to explain the most striking dissimilarities that the Amphipoda can furnish. Lengthen or contract a limb, make a joint tumid or flatten it out, multiply the spines or prickles, narrow or expand the body, or so treat one part of it at the expense of another, let it be cylindrical or depressed or laterally pinched, stiffly outstretched or coiled into a ball,—by such differences as these, in regard to which many species present the most minute transitions, it will be found that genera and families are separated, without the least necessity or reasonableness of attributing to them other than a common origin.

In the hinder part of the pleon the Hyperina show a general but very variable agreement with the Gammarina, but in the front part of the pleon, and especially in the appendages of that part, the agreement is great and very constant. These appendages, commonly called pleopods, are perhaps less subject to variation throughout the two groups than any other part of the organism. Each of the first three segments of the pleon has a pair of these swimming-feet, the three pairs usually differing only a little one from the other; each member of a pair consists of a stem or peduncle supporting two branches; the branches as a rule differ only slightly from one another, each being of tapering form, composed of several joints, of which the first is invariably the largest; of these joints every one has an apical pair of long feathered setæ, which on the small terminal joint are close together. No joint except the first is ever privileged to have more than one pair of these plumes, and no joint is ever normally without its pair.

On the peduncles of these swimming-feet, near the lower angle on the inner side, there

is the curious apparatus spoken of in this Report as the coupling-spines.[1] Among the Gammarina occasionally these spines are numerous; among the Hyperina there are rarely, normally perhaps never, more than two to each peduncle. In both groups they are clearly spines that have been modified to serve one and the same purpose, namely, to hold the peduncles together for the swimming-stroke. For this purpose the apex of each spine is blunted and has backward directed teeth, the edges also often having a retroverted serrature, so that the spines of each pair of peduncles can be interlocked. That both groups, notwithstanding their otherwise extremely divergent forms, should so universally possess these coupling-spines, is surely a note of common ancestry. It is also easy to see that two quite simple spines in this position might be of some service for the object in view by the effect of mere friction, while natural selection would be ready to avail itself of any variation in the direction of the roughening of the spine, until the strongly serrate edges and dentate apices had been at length evolved. In the branches of the pleopods we find another note of community of origin for the two groups above mentioned. Besides the obvious similarity which these branches display in almost all the genera and species, they have in common the less easily noticed feature of carrying one or more cleft spines[2] on the inner margin of the first joint of the inner branch. To this there are only rare exceptions, and those, perhaps, not difficult to explain. Throughout the Hyperina it appears that the joint in question never has more than one such spine, while in the Gammarina the number varies. The object served by these spines is no doubt similar to that of the coupling-spines. One arm of the cleft apex has a subterminal expansion, and the other arm is internally roughened or serrulate. By these contrivances a pair of the spines lying crosswise helps to keep together the branches of the pair of pleopods, and so to add force to the swimming-stroke. But these spines with cleft terminations have plumose shafts, and are evidently plumose setæ modified for a special purpose. Indeed, in some species, in which the pairs of cleft spines are numerous, some of them show a gradational form combining the flexibility of the seta with the cleft termination of the spine.

Another example of gradational forms is exhibited by the maxillipeds of the Gammarina. The outer plates of these organs are commonly fringed with an apparatus, parts of which may be distinguished as respectively, teeth, spines, and setæ, yet the teeth pass into spines, and the spines into setæ by gradations so minute, that the practical difficulty arises in description of determining how many of these little appendages ought to be grouped under one name, and how many under another, yet no one would dream of interchanging the names of the two extremes of the series, the tooth and the seta.

In classifying the families of the Amphipoda within the principal divisions, not a few difficulties are encountered. We may attempt to place side by side those which in the

[1] Described and figured by G. O. Sars in his account of "*Gammarus neglectus*, Lilljeborg," Hist. Nat. Crust. d'eau douce de Norv., p. 53, pl. v. fig. 8, "épines particulières," and indicated by S. I. Smith in his figure of *Cerapus tubularis*, Say, *Trans. Connect. Acad.*, vol. iv. pl. ii. *a*, fig. 5, but not, I think, alluded to by any other writers.

[2] "Soie particulière à bout bifurqué," Sars, *loc. cit.*, fig. 8.

present state of knowledge appear to have the largest number of important affinities. But what affinities should be considered important for classification it is by no means easy to determine. Animals genealogically very wide apart may have adopted similar modes of life, and in so doing have become modified on parallel lines, while on the other hand, in species nearly related by descent, great divergence of character may have resulted from difference of habits, such as the assumption of a parasitic life by one branch of a family, when the other branches have remained independent. In classifying the Gammarina authors have usually placed the Orchestidæ first. In the order of evolution they might rather be placed last. Among these alone of the Amphipoda has a capacity for terrestrial existence been acquired; some of them are gradually adding the faculty of walking upon dry land to the ordinary movements of sliddering and leaping; all of them have lost the mandibular palp. Delage, founding his view upon the circulatory apparatus,[1] suggests that the Corophidæ are the ancestors in common of the other Gammarina and the Caprellidæ. But *Corophium volutator* (Pallas), the subject of Delage's investigation, is far removed from a typical Amphipod. Though it has not the variety of movement found among the Orchestidæ, yet, by having a body flattened instead of laterally compressed, it is perfectly capable of walking. It cannot perhaps, strictly speaking, be said to walk upon dry land, but it walks freely over moist mud in the open air. Of the three pairs of lateral orifices to the heart, so generally found among the Amphipoda, Delage has observed that the first two pairs are wanting in *Corophium volutator*, and that they are small and inactive in the Caprellidæ. But it may safely be said that if the Gammarina and Caprellidæ were descended in separate lines from the *Corophium*, the degraded and inert Caprellidæ would never have acquired the two additional pairs of orifices for which they have, it seems, no urgent need, and which their supposed ancestor of a higher type and more active habits is able to dispense with. Thus, while the character of the heart makes it very improbable that *Corophium* should have been an ancestor of the Caprellidæ, its shape and habits make it quite as unlikely that it should have been an ancestor of the Gammarina, so few of which have any activity out of water, and so many of which, the Orchestidæ included, have the body laterally compressed.

On the supposition of a common origin of all the Amphipoda, it is obvious that families will have been gradually separated by the successive acquisition of distinctive characters. The supposition itself is based upon the fact that some characters are common to many families, since that fact is explained most simply on the principle of inheritance from a common ancestor. In the search, then, for ancestral characters, we must look away from what is rare and exceptional to what is commonplace and unattractive. When any single character is investigated in all the known species, some form will often be found of marked simplicity and completeness, round which the rest

[1] See p. 526.

will be grouped at greater or less distances. These two attributes, simplicity and completeness, are evidently appropriate to an ancestral form. To begin with, each part of an organism will, by inheritance, resemble the part from which it has budded out. Successive variations introduce distinctions between the parts of an organism, just as they introduce distinctions between one organism and another. At the same time the simplicity sought for must be limited by some standard of completeness, otherwise we should be looking for the origin of things in general, not the ancestry of a particular group. In the structure of an Amphipod we may recognize simplicity in the segments of the peræon, where, as a rule, each segment is to a certain extent free from its neighbour and closely resembles it, and we may recognize it also in the flagella of the antennæ and branches of the pleopods, in which, commonly, numerous joints exhibit one and the same pattern. The theoretical completeness of the appendages rests to some extent on a comparison with other groups of Crustacea, but the limits either of completeness or simplicity which are to be expected in the special group are soon arrived at. If, then, by comparing not only one but every available character in all the families, we at length make some approach to a complete set of ancestral characteristics, we shall be able to construct an ideal Amphipod, with no parts degraded and none exaggerated. And if further, by comparing this ideal with existing species, we find one among them bearing an exceptionally close resemblance to it, such a species will have some claim to stand, not perhaps at the head, but in the centre of our classification, as most directly representing the type or original from which the other Amphipoda have in various degrees more widely diverged. As a matter of fact, in the genus *Gammarus* the well known species *Gammarus pulex* and *Gammarus locusta* are very much of the commonplace facies desired. They are naturally chosen for explanatory purposes and as representative species. They have the requisite completeness; the secondary flagellum of the upper antennæ is not wanting as in *Amphithoë*, nor the mandibular palp as in *Dexamine* and the Orchestidæ; the palp of the first maxillæ is not degraded as in *Orchestia*, nor the maxilliped palp curtailed as in *Lafystius;* no segments of the peræon are coalesced as in *Dulichia*, nor of the pleon as in *Atylus* and *Goplana;* the third uropods are not uniramous as in *Metopa*, nor the second as in *Cerapus*. They have also the requisite simplicity, as could easily be shown by a detailed comparison with other species. The distribution of these two species lends an additional probability to the view that they represent an ancestral form. Far more than any other Amphipod *Gammarus pulex* appears to have spread itself over the fresh-water streams of the world, and *Gammarus pulex* is connected by the very closest ties with *Gammarus locusta*. It is clear from the general distribution of the Gammarina that the chief nurseries whence they issue are the weeds of the coast. From these the rivers are accessible as well as the ocean, yet in the rivers the species of Amphipoda are few, while in the ocean they are multitudinous. This admits of a simple explanation, if we accept *Gammarus locusta* as representing the ancestral form which at one time occupied the

world without the competition of other species of Amphipods. In order to enable the family to extend its range over the fresh-waters of the world, no further change was needed than such as would enable some of the progeny to pass from salt-water to brackish, and from brackish to fresh. But the sections of this genus having once obtained command of the rivers, by the capacity of living vigorously in the river-water, would have an immense advantage over all rivals attempting in the future to make a lodgment in the streams, while their capacity for life therein was in its initial stages and only feebly developed.

In the arrangement around and near to *Gammarus* of such genera as *Niphargus* and *Gammaracanthus* and *Mæra*, there is in point of fact a very general agreement, so that we shall not be very rash in regarding the Gammaridæ as a natural family. If from the considerations already mentioned we may regard it also as the typical family of the Amphipoda, the next point of interest will be to determine whether the other families can only be grouped confusedly around it, or whether any lines of succession can be suggested. It is evident that if the *Gammarus*-form had at any time such possession of the ocean-world that it was able to stock the majority of the fresh-water streams with genera and species which can be traced back to it in a direct line, the more or less amphibious Orchestidæ ought to be traceable to the same source. Between *Gammarus* and *Talitrus* there are, it is true, important distinctions, but they are in part bridged over by the genera *Hyale* and *Hyalella*, and to a very considerable extent they show adaptation on the part of the Orchestidæ in general to altered conditions of life.

The next family which seems easily derivable from *Gammarus* is that represented by the genus *Amphithoë*. It will be noticed in the history of the subject, that, before the minute subdivision of genera, the discoverer of a new species, if he did not assign it to *Gammarus*, was very apt to call it an *Amphithoë*. *Amphithoë* indeed has before now been chosen for description as a typical genus of the Amphipoda. The genus, in its present acceptation, has an extremely extensive distribution, and by the simplicity of structure which it exhibits, and its general approximation to *Gammarus*, it is well fitted to be the link between that genus and the nest-forming Podoceridæ in general. Near to, yet not to be derived from, the Podoceridæ, and by their somewhat more erratic characters placed at a greater distance from *Gammarus*, come the Photidæ. Again, at various distances beyond the Podoceridæ, we may imagine positions for the Corophidæ, Cheluridæ, Dulichidæ, and Icilidæ. The Dulichidæ seem to lead on by a very natural sequence to the Caprellidæ, with which Bate and Westwood have gone to the extreme length of actually classing them, in their group Aberrantia.

Returning to the family of the Gammaridæ, we find in close alliance with it two other families, the Atylidæ and Eusiridæ; nor are these remote from the Pleustidæ and Epimeridæ. The remainder are by no means easy to group in any plausible order of relationship to the ancestral form. The eyes of the Ampeliscidæ give them a position

apart from all the rest. The Lysianassidæ are set apart in another direction by the peculiarities of the upper antennæ, the second gnathopods, and especially that character of the mandibles, on account of which Schiødte has named them the Trochalognatha. As far, however, as the antennæ are concerned, they are united to Schiødte's other group, the Eleutherognatha, by the new family Valettidæ. The Stegocephalidæ, while agreeing with the Lysianassidæ in the upper antennæ, are less remote from *Gammarus* in the form of the second gnathopods. On the other hand, the character of the mandibles shows a further departure from the common type than is found anywhere else among the Gammarina. Hence a common ancestry may be supposed for these three families, branching off from *Gammarus* at a remote period.

In the Stenothoidæ the genus *Stenothoe* itself, being without the mandibular palp, may be regarded as a later form than the companion genus *Metopa*, in which that palp is retained. In the Leucothoidæ the genus *Leucothoë*, by the characters of its mandibles and maxillipeds, seems to lead up to the Stenothoidæ.

The Syrrhoidæ and Synopidæ on several accounts may plausibly be placed side by side. In one particular, the very short terminal joint of the mandibular palp, these families show an affinity to the Stenothoidæ; but apart from this one point their affinities are with the Pontoporeiidæ. Nearer than any of these to *Gammarus* stand the Œdiceridæ.

The Iphimedidæ, Pardaliscidæ, and Amphilochidæ remain, with peculiarities that make every suggestion for their classification hazardous. At a venture the Pardaliscidæ may be grouped with the Syrrhoidæ, Synopidæ, and Pontoporeiidæ; the Iphimedidæ with the Pleustidæ and Epimeridæ; and lastly, the Amphilochidæ left, where they are usually placed, in a somewhat dubious proximity to the Stenothoidæ.

Between the Gammarina and Hyperina there is a wide gap, over which at one point no bridge has yet been found, for, while in the Gammarina the maxillipeds always have a palp, they never have one in the Hyperina. In the Gammarina the mandibular palp has, with the rarest exceptions, a short first joint, whereas in the Hyperina this joint is frequently of great length, but here there are all sorts of connecting links, the mandibular palp in *Cyllopus* being quite of the pattern common among the Gammarina. Milne-Edwards, in 1840, when establishing the Tribu des Hypérines Gammaroides, went so far as to say that the single genus, *Vibilia*, which he placed in it as a link between the Gammarina and the ordinary Hyperina, might almost as well stand in one division as the other. To this overstatement of the closeness of the tie between the two groups he was no doubt led by wrongly supposing that *Vibilia* had rudimentary palps to the maxillipeds.

Within the Hyperina, although marvellous diversity of form has been arrived at, there is comparatively little difficulty in tracing a family resemblance between the different sections. Naturally the Platyscelidæ or Hypérines anormales, with their strange zigzag

folding antennæ, may be regarded as the latest development, but the whole group of Hyperina must be supposed to be interconnected, not to be derived partly from one branch and partly from another branch of the existing Gammarina. It may be noticed, indeed, that though the Gammarina by their maxillipeds testify to an older type than is seen in the Hyperina, yet the latter in some genera retain in their turn a mark of antiquity which the Gammarina have lost, in the simplicity of the gnathopods, for these in *Dairella* and *Lycæopsis* are like ordinary peræopods. The general structure of the upper antennæ in the Hyperina calls to mind the family Lysianassidæ, but there is the marked distinction that in none of the Hyperina is there a secondary flagellum to these antennæ; yet here the recently discovered *Hyperiopsis røringii*, Sars, may supply a link, since with the antennæ of the Lysianassidæ this curious species combines the eyes of a Hyperid. A connection between the Hyperina and the Lysianassidæ has already been indicated by Boeck, who placed the family Prostomatidæ at the head of the Gammarina, in immediate sequence to the Hyperina, because of the agreement which he considered to exist between that family and the Hyperidæ and Orchestidæ. The Prostomatidæ are in close relationship with the Lysianassidæ, and might, in my view, well be included in the older family. But if the Hyperina make any real approach to the Lysianassidæ, it must not be supposed that they are derived from them, for the mandibles of the Gammaroid Hyperina point more directly to the *Gammarus*-form than to that found in the Trochalognatha.

In offering these contributory suggestions towards a classification of the Amphipoda, my hope is that either by occasionally hitting the mark they may be of service, or that where they have missed it they may provoke a fruitful criticism, and either way that they may excite the ambition of the discerning and ingenious to throw light upon the many problems which are still obscure.

Nomenclature.—Most naturalists will sympathise with the lady who thought that, of all the discoveries astronomers had made about the stars, the finding out their names was the most wonderful. In zoology the new discoveries are generally far more troublesome to name than they would be if they were only stars or planets. A genus of sharks is bound to give way, if it turns out that a genus of animalcules has received the same appellation a month earlier, and the genus of animalcules, however laboriously and scientifically described, must give way in its turn, if it should prove that the same group of creatures has been obscured rather than explained fifty years before under a different name. But apart from these casualties, there is the enormous and increasing difficulty which arises from the multitude of workers in every field of natural history, who, in the absence of any rule or convention to the contrary, publish new genera and species in any literary vehicle that is for the moment handiest. One isolated description may have to be sought for in a costly volume of travels, and another in the local journal of Timbuctoo. It is rather to be wished than expected that an international law in science should intervene, and allow validity and priority only to names adequately published in

definite periodicals, of which one or more might be assigned to each large division of the animal and vegetable kingdoms. Even under this utopian arrangement the requirements of adequate publication would be very much at the mercy of different contributors.

Looking only to the Amphipoda, one sees and feels the natural tendency in those who describe actual specimens to multiply genera and species, while in those who classify the results obtained by others, the tendency is to be impatient of minute distinctions, to rejoice at being able to unite two species into one, and to ignore one genus in favour of another which they regard as embracing it. Nothing but good is done by those who pare away the superfluities of nomenclature by discovering that the same genus or species has been described under more than one name, but it is a question whether much profit has resulted from attempts to discard small genera in favour of a large comprehensive genus. In the history of the subject we see that the names of the rejected genera almost invariably obtain eventual acceptance, so that the attempts at suppression only result in a confused synonymy. Few authors, for instance, would now dispense with *Melita* and *Mæra* of Leach, which to Milne-Edwards appeared useless and even injurious subdivisions of *Gammarus*.[1] Those who take the lead in introducing minute subdivisions do, indeed, force the hand of their successors, since differences which might well have been regarded as specific under a moderately wide genus, have to be accounted generic when the already existing genera of a family are separated by very small distinctions. But premature interference rather increases than remedies the confusion, although, when knowledge of the subject has largely advanced, the time and opportunity for a general revision may arrive and be thoroughly welcome.

As far as the form of a name is concerned, it has seemed to me beyond all question best to adopt that which the author of the name himself gave to it. This was far from being my original opinion. It is, of course, a delightful effort of criticism, and a token of one's own intrinsic superiority, to be able to correct the spelling of some eminent man of science. But in actual practice each correction makes a new name, adding therefore to the synonymy, and often making necessary the citation of two authorities instead of one. Sometimes the corrected form of a name comes into collision with a genus established before or since in some other branch of zoology. Sometimes a name is inconveniently lengthened in the effort to make it conform to the laws of philology, and a syllable is inserted which the originator of the name perhaps intentionally left out. As Leach has shown, it is not necessary for a scientific name to have a derivation at all, so that in the last resort the names which do not satisfy the laws of classical formation may be defended on the ground that one congeries of letters is as good as another. At any rate, for the purposes of natural history, the fixity of a name is of far more importance than any indirect lesson in scholarship of which it may be made the text. I may as well, however, confess that in respect to the genus *Amphithoë* I have not had courage to

[1] Hist. Nat. des Crust., t. iii. p. 54.

revive Leach's original *Ampithöe*, and that in pedantically printing *Caprella equilibra*, Say, instead of Spence Bate's *Caprella æquilibra*, my object has been much more to emphasize the general view here advocated than to make converts to the use of that particular illustration of it. The custom of changing the gender of specific names, when species are transferred from genus to genus, seems to me inconvenient and unnatural. In every species of the Amphipoda there are males and females, and since the ungallant Romans imagined the masculine to be the worthier gender, it would tend to simplicity if that gender were preferred in the formation of all specific names. Changing the masculine ending into a feminine, to match the nominal sex of the genus, is much like saying that a man must be a woman if his parents have happened to christen him Maria.

The pronunciation of the names used in natural history is of comparatively little importance, since they are so much more frequently read by the eye than pronounced by the tongue. Nevertheless, it would be an advantageous custom if authors, when introducing a new name, would supply their readers with some means of determining the quantity of a doubtful syllable. In pronouncing long-established names, such as Gammarina, Caprellina, Hyperina, where the derivation will not help us, we must be guided either by usage which may fluctuate, or by euphony in respect of which tastes may differ, or by the genius of our own language which is pretty sure to prevail in the end. In the three examples cited, my own opinion is, that the penultimate syllable ought to be pronounced short, the accent being in each case laid upon the ante-penultimate. Although the Greek word ὑπέρινος, so accented and having a short penultimate syllable, has nothing to do with our Hyperina, yet the mere existence of such a word proves that there is nothing monstrous in the pronunciation now recommended.

Distribution.—How very extensive is the range of the Amphipoda may partly be seen by a glance at the map accompanying this Report. Northward, Amphipoda have been taken within 400 miles of the pole; in the opposite direction as far down as lat. 68° S. Of the great depths from which some of the Challenger Amphipoda are reported I do not like to speak with too much certainty, but there is no special reason for doubting that *Lanceola pacifica*, for instance, came actually from the depth assigned it of 2300 fathoms. It does not seem unnatural that some of the group should have been able to penetrate even to so great a depth as 13,800 feet beneath the surface of the sea, since on the continent of South America Mr. Whymper has found them at 13,300 feet above it. All the waters of the world, arctic and tropical, salt, brackish and fresh, oceans, lakes, rivers and wells, are tenanted by Amphipoda. From the rocks and sands and muddy fringes of coast and shore they are pushing out advanced guards in a sort of tentative manner on to the land, where, for ought we know, they may yet have a great future before them. That they have thriven so well hitherto may be attributed to various advantages, chiefly perhaps to their ready adaptability to so many varying circumstances. Diminutive size and mimetic colouring will often have helped to protect

them. An appetite, voracious, indeed, but not over fastidious, will seldom have allowed them, like more scrupulous feeders, to starve in the midst of plenty, while the prodigious swarms they bring forth have enabled them to offer a wholesome banquet to the monsters of the deep without any injurious diminution of their own numbers. The following list exhibits the species which have a more or less doubtful claim to have come from a depth greater than 300 fathoms. It is interesting to notice, that in the thirty-one specimens of Gammarina reported from these vast depths, twenty-five genera are represented, of which ten are new, and twenty-eight species, of which twenty-six are new.

Gammarina.

	Fathoms.		Fathoms.
Anonyx ampulloides, Sp. Bate,	775	*Amathillopsis australis*, n. sp.,	1400
Platamon longimanus, n. g. et sp.,	1125	*Pleustes abyssorum*, n. sp.,	1600
Onesimoides carinatus, n. g. et sp.,	1400	*Atylopsis emarginatus*, n. g. et sp.,	310
Cyphocaris micronyx, n. sp.,	1500	*Cleonardo longipes*, n. g. et sp.,	1775
,, ,, ,,	1425	*Eusiroides crassi*, n. g. et sp.,	600
Euonyx normani, n. sp.,	630	*Synopioides macronyx*, n. g. et sp.,	1500
Orchomene abyssorum, n. sp.,	1900	,, ,, ,,	2025
Amaryllis haswelli, n. sp.,	1000	*Elasmopus subcarinata* (Haswell),	1100
Valettia coheres, n. g. et sp.,	1975	*Elasmopus delaplata*, n. sp.,	600
Andania gigantea, n. sp.,	1375	*Ampelisca abyssicola*, n. sp.,	390
,, ,, ,,	1600	*Gammaropsis thomsoni*, n. sp.,	1100
Andania boecki, n. sp.,	675	*Podoceropsis kermadeci*, n. sp.,	630
Andania abyssorum, n. sp.,	1100	*Podocerus hoeki*, n. sp.,	1100
Leucothoë tridens, n. sp.,	1100	*Paradryope orguion*, n. g. et sp.,	2300
Syrrhoë papyracea, n. sp.,	390	*Camacho bathyplous*, n. g. et sp.,	1100
Œdiceroides cinderella, n. g. et sp.,	1035		

Hyperina.

Lanceola pacifica, n. sp.,	2300	*Cystisoma spinosum* (Fabricius),	1090
Lanceola sp.,	1915	,, ,, ,,	(?) 2500
Lanceola sp.,	1775	,, ,, ,,	630
Lanceola sp.,	360	,, ,, ,,	1850
Lanceola æstiva, n. sp.,	675	*Cystisoma* sp.,	825
Lanceola suhmi, n. sp.,	1250	*Cystisoma* sp.,	500
Lanceola australis, n. sp.,	1800	*Phronima novæ-zealandiæ* (?),[1] Powell.	
Cystisoma spinosum (Fabricius),	1500	*Platyscelus ovoides* (Risso?). Deep tow-net.[2]	

[1] 1800 fathoms was the depth at the station at which this species of *Phronima* was taken, but in all probability the *Phronima* was taken at the surface.

[2] The depth at Station 243 at which this species was taken is 2800 fathoms.

Almost all the Hyperina, except in the genera *Lanceola*, *Cystisoma*, and *Phronima*, were expressly labelled as having been taken at or near the surface. In regard to the specimens of *Phronima*, it was probably considered that their capture at the surface would be taken for granted, their floating habitations having been frequently obtained.

How incomplete is our present knowledge of the whole group may be inferred, as well from the numerous additions which almost every voyage of scientific exploration makes to it, as in especial from those additions which the Challenger made by a few weeks stay in the Southern Ocean at Kerguelen Island and Heard Island. For, by the exertions of the Challenger Naturalists, from this small region, previously supposed to be very barren in Amphipods, the following list of species was obtained :—

Among the Gammarina :—

Anonyx cicadoides, n. sp., K.[1]
Tryphosa antennipotens, n. sp., H.
Tryphosa barbatipes, n. sp., K.
Hippomedon kergueleni (Miers), K.
Hippomedon trigonicus, n. sp., K.
Cheirimedon crenatipalmatus, n. sp., K.
Sophrosyne murrayi, n. sp., K.
Orchomene carimanus, n. sp., K.
Lepidepecreum foraminiferum, n. sp., K.
Socarnoides kergueleni, n. sp., K.
Ambasia integricauda, n. sp., K.
Acontiostoma pepinii, n. sp., K.
Acontiostoma kergueleni, n. sp., K.
Kergueleuia compacta, n. sp., K.
Metopa nasutigenes, n. sp., K.
Cardenio paurodactylus, n. sp., K.
Phoxocephalus kergueleni, n. sp., K.
Harpinia obtusifrons, n. sp., K.
Urothoë lachneëssa, n. sp., K.
Halimedon schneideri, n. sp., K.
Œdiceroides rostrata, n. sp., K. and H.
Zaramilla kergueleni, n. sp., K.
Acanthechinus tricarinatus, n. sp., H.
Iphimedia pacifica, n. sp., K.
Iphimedia pulchridentata, n. sp., H.
Atyloides australis (Miers), K.
Harpinioides drepanocheir, n. sp., K.
Tritæta kergueleni, n. sp., K.
Rhachotropis kergueleni, n. sp., K.
Eusirus longipes, Boeck, K. and H.
Eusiroides pompeii, n. sp., H.
Liljeborgia consanguinea, n. sp., K. and H.
Photis macrocarpus, n. sp., K.
Aora kergueleni, n. sp., K.
Aora trichobostrychus, n. sp., K.
Autonoe kergueleni, n. sp., K.
Gammaropsis exsertipes, n. sp., K.
Amphithoë kergueleni, n. sp., K.
Podocerus falcatus (Montagu), K.
Cerapus sismithi, n. sp., K.
Haplocheira plumosa, n. sp., K.
Platophium danæ, n. sp., K.
Neohela serrata, n. sp., K.

Among the Caprellina :—

Dodecas elongata, n. sp., K.
Protellopsis kergueleni, n. sp., K.

Among the Hyperina :—

Vibilia sp., between K. and H.
Euthemisto gaudichaudii (Guérin), K.
Primno sp., K.

[1] K. stand for Kerguelen, H. for Heard Island.

Of the forty-eight species here enumerated, all but about half a dozen have been brought to light by the Challenger researches, and of the genera over which these species are distributed thirteen out of forty-three are new.

It may be convenient here to group together the names of the thirty-one new genera established in this Report :—

Cheirimedon.
Platamon.
Onesimoides.
Sophrosyne.
Cyclocaris.
Socarnoides.
Acontiostoma.
Kerguelenia.
Valettia.
Cardenio.
Platyischnopus.
Œdiceroides.
Zaramilla.
Acanthechinus.
Atyloides.
Atylopsis.
Harpinioides.
Stenopleura.
Cleonardo
Eusiroides.
Synopioides.
Parelasmopus.
Dryopoides.
Paradryope.
Camacho.
Chosroës.
Dodecas.[1]
Caprellinoides.
Protellopsis.
Sympronoë.
Streetsia.

The new generic names proposed in the Report in exchange for older but preoccupied names of valid genera are as follows :—*Caprellinopsis* for *Caprellina*, G. M. Thomson ; *Eusceliotes* for *Euscelus*, Claus ; *Lysianax* for *Lysianassa*, Milne-Edwards ; *Pariambus* for *Podalirius*, Krøyer ; *Phorcorrhaphis* for *Phoreus*, Milne-Edwards ; *Phoxocephalus* for *Phoxus*, Krøyer; *Priscillina* for *Priscilla*, Boeck. *Haustorius*, Müller, is reinstated in place of *Lepidactylis*, Say, *Phtisica*, Slabber, in place of *Proto*, Leach, and *Scinà*, Prestandres, in place of *Tyro*, Milne-Edwards, and *Clydonia*, Dana. *Æginella*, Boeck, is taken to include the preoccupied *Ægina*, Krøyer. For *Constantia*, Dybowsky, *Costantia*, a form accidentally occurring in Dybowsky's own work, is adopted. For *Eurytenes*, Lilljeborg, *Eurythenes* is accepted from the pen of Professor S. I. Smith. For *Dryope*, Sp. Bate, although preoccupied, no alternative name is for the present offered, its relationship to the new genus *Dryopoides* requiring further consideration.

Of the hundred and eighty species which the Report describes as new, it is possible that a few come too near to older species to deserve specific distinction. Especially in the genera *Hippomedon*, *Leucothoë*, and *Aora* my suspicions are aroused that I may have introduced some unnecessary names ; but such errors of judgment, if found to exist, will also, I hope, be found to be few.

[1] This genus was first published in a preliminary notice in 1883.

BIBLIOGRAPHY.

B.C. Cent. IV. ARISTOTELES, born about 385, died 322 B.C.

De Animalibus Historiæ. Libri x. (Jo. Gottlob Schneider, Lipsiæ, 1811). These *ἱστορίαι περὶ τὰ ζῷα* were probably published within the last thirteen years of their author's life. After his writings had met with sundry changes and chances, there is reason to believe "that about 50 years B.C. Andronicus produced the first edition of the collective works of Aristotle." See The Ethics of Aristotle, by Sir Alexander Grant, 1874, p. 9.

The passages in Aristotle which probably refer to the Amphipoda are the following:—Book iv. ch. 2, *Τῶν δὲ μαλακοστράκων ἓν μέν ἐστι τὸ γένος τὸ τῶν καράβων· καὶ τούτῳ παραπλήσιον ἕτερον τὸ τῶν καλουμένων ἀστακῶν. Οὗτοι δὲ διαφέρουσι τῶν καράβων τῷ μὴ ἔχειν χηλὰς καὶ ἄλλας τινὰς διαφορὰς οὐ πολλάς. Ἓν δὲ τὸ τῶν καρίδων, καὶ ἄλλο τὸ τῶν καρκίνων. Γένη δὲ πλείω τῶν καρίδων ἐστὶ καὶ τῶν καρκίνων· τῶν μὲν γὰρ καρίδων αἵ τε κυφαὶ καὶ αἱ κραγγόνες καὶ τὸ μικρὸν γένος· αὗται γὰρ οὐ γίγνονται μείζους.* Of the Malacostraca one genus is that of the carabi, and near to this a second of those called astaci. These differ from the carabi in not having chelæ, and in a few other points. One genus is that of the carides, and another that of the carcini. There are several genera of the carides and of the carcini; for to the carides belong the gibbæ and the crangons, and *the little genus; for these grow no bigger*. Book iv. ch. 10, a passage, unfortunately incomplete, relating to the sleep of fishes and other water animals that have no eyelids: *Ἁλίσκονται γὰρ οἱ ἰχθύες, εἰ μὴ διὰ τοὺς φθεῖρας καὶ τοὺς καλουμένους ψύλλους . . . . [οὕτως ἀτρεμίζοντες,] ὥστε κἂν τῇ χειρὶ λαμβάνειν ῥᾳδίως· νῦν δ' ἂν χρονίσωσι οὗτοι τῆς νυκτὸς, κατεσθίουσι προσπίπτοντες πολλοὶ τὸ πλῆθος ὄντες. Γίγνονται δ' ἐν τῷ βυθῷ τῆς θαλάττης καὶ τοσοῦτοι τὸ πλῆθος, ὥστε καὶ τὸ δέλεαρ ὅ τι ἂν ἰχθύος ᾖ, ἐὰν χρονίσῃ ἐπὶ τῆς γῆς, κατεσθίουσι· καὶ ἀνέλκουσι πολλάκις οἱ ἁλιεῖς περὶ τὸ δέλεαρ ὥσπερ σφαῖραν συνεχομένων αὐτῶν.* For fish, unless [they are disturbed] by the lice and *so-called fleas*, are surprised in so tranquil a condition as to be easily taken even in the hand. But now if these are left [in the nets] during the night, they (the fleas) being many in number fall upon and devour them. In the deep of the sea they grow in such multitudes that any piece of fish for bait, if left long on the ground, they devour. And often the fishermen draw up round the bait as it were a globe of them clinging to it.

Gerstaecker thinks that *the little genus* of the first passage may well refer to such an Amphipod as *Gammarus locusta*. Boeck considers that the *ψύλλοι* of the second passage, which eat the fish in the nets, are also likely to be Amphipods, since in the northern seas these act exactly in the way described. The statements of Klein and Holboll confirm this. As Aristotle apparently speaks of the bait on land, "*ἐπὶ τῆς γῆς*," being eaten by these creatures, it is likely enough that he alludes to more than one species; unless, as Bellon evidently supposed, the land intended be not dry land or shore, but the ground at the bottom of the sea.

A.D. Cent. I. Caius Plinius Secundus, born A.D. 23, died A.D. 79.

Historia naturalis. Libri xxxvii. (Gabriel Brotier, Tomus ii., Parisiis, 1779).

In book xi. sect. lxii., Pliny speaks of Crustata among marine animals. No earlier use of the word in this application seems to be known. In book ix. sect. xxi. he says, "Animal est parvum, scorpionis effigie, aranei magnitudine. Hoc se, et thynno, et ei qui gladius vocatur, crebro delphini magnitudinem excedenti, sub pinnâ adfigit aculeo: tantoque infestat dolore, ut in naves sæpenumero exsiliant." This passage is only worth noting in comparison with Risso's statement that a species of *Cyamus* sometimes so irritates the thunnies in the Mediterranean that they jump out of water. Lütken supposes that Risso has assigned to *Cyamus* an effect produced really by *Brachiella thynni*. In book ix. sect. lxxi., Pliny appears to confuse, in a rather ludicrous passage, the φθεῖρες and ψύλλοι mentioned in book iv. ch. 10, of Aristotle's History of Animals. In book ix. sect. li. he gives "Cancrorum genera, carabi, astaci, maiæ, paguri, heracleotici, leones, et alia ignobiliora," among which the ignobiliora may be supposed to correspond to the μικρὸν γένος of Aristotle, and to include some at least of the Amphipoda.

1553. Bellon (or Belon), Pierre, born about 1517, died 1564 (Encycl. Brit., 9th Ed.).

Petri Bellonii Cenomani De aquatilibus, Libri duo Cum iconibus ad viuam ipforum effigiem, quoad ejus fieri potuit, expressis. Parisiis, M.D.LIII.

The second book, pages 318–348, is de aquatilibus exanguibus. Of these "quæ Græcis ἔναιμα, nobis exanguia dicuntur," he says, "alia dura quidẽ testa operiuntur, quæ illi ὀστρακόδερμα, alia verò molli: quæ etiam μαλακόστρακα vocãt, atque alia rursus insecta, sub quibus magna marinorum ac fluviatilium phalanx continetur. Exanguiũ igitur molles à nobis describentur ac depingẽtur primum locustæ, cancri et id genus cæteri. . . . . Vltimo loco dejectamenta marina, nominibus etiam insignibus prædita explicabuntur, quibus non-nunquam etiam vesci solemus."

Among the Crustata he considers that the Squilla fluviatilis parva, the Gambarella of the Romans, is intended by Aristotle's "parvæ quæ majores nunquã effici possunt." In this Bellon is evidently not thinking of any Amphipod. The only allusion that he makes to Amphipods is to be found, if anywhere, in his cap. xii. p. 436, "De deiectamentis marinis," in the section headed "Asilus sive Œstrum." This Isopod he figures with eight thoracic feet on each side, and concludes his account of it as follows:—"Aristoteles octauo de historia animalium: Thunni (inquit) et Gladii agitantur œstro, canis exortu. habent enim vtrique per id tempus sub pinna ceu vermiculum quem Asilum vocant. Idem author videtur œstrum seu Asilum diuersum à pediculo et pulice constituere, quum eis etiam nomina propria φθεῖρα θαλάσσιον, id est, pediculum marinum, et ψύλλαν θαλάττιον, id est pulicem marinum, imponat. Vocãt et in mari pediculos (inquit Plinius) eosque tritos instillari ex aceto auribus jubent. Pisces vel manu caperentur, dum dormiunt (inquit Aristoteles) nisi pediculis et pulicibus solicitarentur. Gignuntur in profundo maris tanta fœcunditate, vt escam de pisce emollitam, si diu in imo manserit, totam corrodant atque absumant. Et quidem sæpenumero piscator escam demissam, glomeratis vndique his bestiolis, perinde vt pilam attollit." Aristotle's "ἐπὶ τῆς γῆς," is here represented by "in imo," meaning "at the bottom of the sea," which is perhaps an attempt to correct the unmeaning words "in uno" in Gaza's translation, for which Aubert and Wimmer (1868) suggest "in humo."

1554. Rondelet, Guillaume, born 1507, died 1566 (Biographie Universelle).

Libri de piscibus marinis in quibus veræ piscium effigies expressæ sunt. Lugduni, M.D.LIIII. pp. 534–577.

Liber xviii., De Piscibus, quæ dicantur Crustacea, contains chapters on Stalk-eyed and Sessile-eyed Crustacea and on Echinoderms. Chapter xxvii., De Pulice marino, begins: "Cum Maris purgamentis aliquoties reperi bestiolam tenui crusta intectam, quam hic depinximus, quæ facie homunciones ridiculè pictos vel simiam repræsentat aliis partibus locustæ similis est, in cauda appendiculas habet locustæ et squillæ modo, tam exigua est ut particulæ corporis nisi ab oculato discerni possint, ob parvitatem negligitur. Hanc puto esse *ψύλλον θαλάττιον*, id est, pulicem marinum, de quo Aristoteles, quum de piscium somno agit." He then proceeds with a translation of the passage from Aristotle, lib. iv. ch. 10. Boeck thinks he means some species of *Gammarus*. The accompanying woodcut will give a fair idea of Rondelet's drawing, which has the special interest of being, I believe, the earliest known figure of an Amphipod, whether the original were a *Gammarus*, or, as seems equally possible, an *Orchestia*. In saying that its *facies* "represents a human being caricatured or a monkey," Rondelet has probably mistaken the tail for the head.

Fig. 1.

In ch. xxviii., De Pediculo Marino, he gives the figure of an Isopod, but explains that the *φθεὶρ θαλάττιος* of Aristotle applies not only to this, but also to a species, "qui in mari, quod est à Cyrena ad Ægyptum circa delphinum est, qui omnium pinguissimus fit pabuli copia, quæ delphini opera suppeditatur." The *οἶστρος* of Aristotle, from the fins of the thunny, like a scorpion, and of the size of a spider, is not to be confused, he says, with these *φθεῖρες*.

1558. Gesner, Conrad (or Gessner, Konrad), born 1516, died 1565 (Encycl. Brit., 9th Ed.)

Conr. Gesner, medici Tigurini: Historiæ animalium Liber IV, qui est de piscium et aquatilium animalium natura cum iconibus singulorum ad vivum expressis fere omnib. DCCVI. Continentur in hoc volumine Gulielmi Rondeletii quoque medicinæ professoris Regii in Schola Montpeliensi & Petri Bellonii Cenomani, medici hoc tempore Lutetiæ eximii, de aquatilium singulis scripta. Tiguri, MDLVIII.

Boeck, De Skand. og Arkt. Amph., p. 19, gives the date of this work as 1548, and he says, p. 32, that it repeats on p. 994 Rondelet's text without any addition of importance, under the heading *De pulici marino Rondeletico*. Since the date 1548 was inconsistent with the reference to Rondelet, and the first edition of Gesner's work was not to be met with in England, I sought information from Copenhagen, and Mr. G. E. C. Gad has had the kindness to send me the full title and the date as above given of the first edition in question, from the Royal Library in Copenhagen. The first volume, he tells me, is dated 1551, the fourth volume 1558, and in this latter the heading "De publice [pulice] marino Rondeletius" occurs not on page 994, but on page 894. In the 2nd Edition, 1620, the notice occurs on pp. 759–760. To Rondelet's account is added "Gignuntur et in stagnis marinis similes," and a "Corollarium" about the uses of the *psyllus marinus* which leaps about on the shore. The reference in the Index to the account of the *Pediculus marinus* of Rondelet is given wrongly as p. 649 instead of 694.

1560. Gesner, Conrad.

Nomenclator aquatilium animantium. Icones animalium aquatilium in mari et dulcibus aquis degentium, plus quam DCC. cum nomenclaturis singulorum Latinis, Græcis, Italicis, Hispanicis, Gallicis, Germanicis, Anglicis, aliisq; interdum, per certos ordines digestæ. Tiguri, Anno M.D.LX.

In Tomus I. he includes seventeen orders of marine animals, the Crustata forming the fourteenth. The fifteenth embraces the Testacea, a large portion of which in the body of the work is headed De Crustatis, apparently by a printer's error. The sixteenth order is formed of the Insecta Marina, "nt sunt, Hippocampus, Eruca, Pediculus, Pulex, Asilus, Hirudo mar. Vermes et Lumbrici quidam, Scolopendræ." On p. 267 he remarks, "Pulicem et Pediculum marinos, quanuis tenui crusta integantur, Insectis potiùs. qnàm ut Rondeletius Crustaceis, adiunximus, quòd forma eorum tota à Crustatis plurimùm differre nideatur, magisq; ad Insecta accedere."

On p. 268 he says, "Pulex marinus Rondeletij. Ψύλλος θαλάττιος: sic dictus est nimirum non tam à formæ, quam saliendi similitudine, et similiter pisces in mari infestandi natura, nt Pulices in terra molesti sunt animalibus." He then borrows from Rondelet, and concludes, "Niphus Scolopendras mar. uulgò Pulices marinos dici scribit, quòd pisces eodem modo infestent. nos Scolopendras mar. longe alias dabimus inferiús. Germ. F. Ein Meerflohe."

Among the fresh water animals of Tomus II. he gives *Astacus fluviatilis* and *Cancer fluviatilis* but no Amphipoda. His brief remarks on *Pulex marinus* are perhaps generalised from what he has read, heard, or seen of animals belonging to the Orchestidæ, Gammaridæ, and Cyamidæ.

1565. Matthiolus (Mattioli), Petrus Andreas, born 1500, died 1577 (Biographie Universelle).

Commentarii in vi libros Pedacii Dioscoridis Anazarbei de Medica materia, ab ipso autore recogniti, et locis plus mille aucti, MDLXXXIII. Venetiis. (Epistola nuncupatoria, dated MDLXV.)

Pages 278–284 discuss various Crustacea or Crustata, including *Cancer*, *Astacus*, *Gammarus*, *Squillæ*, *Maia*, *Pagurus*, *Cancelli;* none of them Amphipods. He refers to Aristotle's book iv. ch. 2, producing the often quoted words "Squillarum enim genere continentur gibbæ, crangones, et parvæ, quæ majores nunquam effici possunt," with the remark, "Quibus liquidò constat, vulgares gammarulos Aristoteli parvas facilè esse Squillas, cùm ii majores nunquam evadant, quàm qui semper parvi in piscariis habentur venales."

1606. Aldrovandi, Ulisse, born 1522, died 1605 (Biographie Universelle). (The date 1607, given in the Encycl. Brit., 9th Ed., is inconsistent with the title page here quoted).

Vlyssis Aldrovandi Philosophi, et Medici Bononiensis. De Reliquis Animalibus exanguibus libri quatuor, post mortem ejus editi: Nempe De Mollibus, Crustaceis, Testaceis, et Zoophytis. Bononiæ, 1606.

The second book is De Crustatis, and contains the wisdom of the ancients concerning these animals. In regard to the name he says, "Quæ Græci et præsertim Aristoteles μαλακόστρακα, Latini hoc tempore Crustacea vocant: Plinius Crustata, cum inquit, In marinis

Crustata et Cartilaginea priores dentes habent." Nothing certain about Amphipods can be derived from Aldrovandus, though some of his allusions to the small kinds of Crustacea may have them in view. The remark attributed to Pliny is not that which he actually makes. On the contrary, as to these *dentes* he seems to express a doubt by the words, "At in marinis crustata et cartilaginea primores [sc. dentes] habere, item echinis quinos esse, *unde intelligi potuerit, miror.*" Aldrovandi's misquotation reappears in Facciolati's great Latin Dictionary, except that "primores" is there correctly given instead of "priores."

1634. Moufet, Thomas, born about 1550, died 1604 (thirty years before his work was published).

Insectorum sive Minimorum Animalium Theatrum : *Olim ab* Edoardo Wottono, Conrado Gesnero, Thomaque Pennio *inchoatum :* Tandem Tho. Moufeti Londinâtis operâ sumptibusq'; maximis concinnatum, auctum, perfectum : Et ad vivum expressis Iconibus suprà quingentis illustratum. Londini, 1634.

On page 321 he says, "Pediculus marinus Insectum est Balneis [Balænis?] cetorumque generi infestum, quos mordendo titillandoque ita in furorem agit, ut se in arenas projicere aridumque petere cogantur." The figure at the side is not a *Cyamus* but one of the Cymothoidæ. On page 322 he says, *Pulex* sive *Asellus marinus* squillam molliorem refert, nisi quod quatuor tantum pedibus (pace Gesneri dixerim) donatur, et frequentibus longisque saltibus se liberat, à numero pedum. Asellus dicitur a saltu, Aristotelis pulex : à dorso gibboso, Scrofula nuncupatur ; color illi lividus cum nigredine. Longitudo fluviatilium, digitum transversum ; latitudo, semidigitum non superat ; marinorum major dimensio, qui littore refluente, et in aquis dulcibus sæpe conspicitur. Venatoribus item spectatoribusque mirum agilitatis præbet exemplum." There is a figure given, without name or reference, on the last plate but one, which is probably a generalised representation of this description. It is rather a satire on the expression "ad vivum expressis Iconibus" in the title. The animals referred to may include the sand-hoppers and shore-hoppers, *Talitrus*, *Orchestia*, *Hyale*, as well as the fresh-water *Gammarus pulex* and the salt-water *Gammarus locusta*, *Gammarus marinus*, et hoc genus omne.

1665. Sachs, Philipp Jacob, born 1627, died 1672 (Hagen).

Γαμμαρολογια sive Gammarorum, vulgo Cancrorum consideratio physico-philologico-historico-medico-chymica, *in qua*, Præter Gammarorum singularem Naturam, Indolem et multivarium usum non minus reliquorum Crustatorum instituitur tractatio Ad Normam Collegii Naturæ Curiosorum, Plurimis Inventis Secretioribus Naturæ Artisque Locupletata *â* Philippo Jacobo Sachs à Lewenheimb, Siles. Ph. & Med. D. et Colleg. Nat. Curios. Collega. Francofurti & Lipsiæ, Sumptibus Esaiæ Feligebelii Bibliop. Wratislav. M.DCLXV.

The title of this curious and amusing book very fairly indicates its contents, only unfortunately at that time the Crustacea now known as Gammarids had excited little or no attention. On page 92 he mentions that the Squillæ are divided into *marinæ* and *fluviatiles*. He then continues : "*Marinæ* rursus secundum *Arist. IV. H. 2*, in Latas, κράγγονες, *crangones*, in Gibbas κύφας et *in parvas* quæ nunquam majores fiunt" dividuntur. The *Squillæ gibbæ*, he says, are divided by Schoenfeld into two species. With the smaller, which does not turn red when cooked, at the mouth of the Elbe and the Oder they feed pigs and ducks,

so numerous are these shrimps. This may refer to the common eatable shrimp, but what follows appears to include species of *Orchestidæ* or other Amphipods, for he says: "In Holsatia vocantur Purren / Dithmarsis Krent / Belgis Garnelen / Garners / Garnaten / Gallis Sauterdle, Cheorette, Guernette, ein Seegityle / Meergeis *Gesn. f. 127.* Springfrebse. In Sanctonum littore maxima earum copia est, et alibi quoque in littoribus Germaniæ et Belgii. Hæ parvæ Squillæ gibbæ avide expetuntur ab Harengis." He goes on to say that many eminent naturalists had stated that the herring fed on nothing but sea-water, an opinion which Behm had satisfactorily refuted by finding in a herring's stomach forty *Squillæ gibbæ* (Garneel), and Neucranzius by finding more than sixty, though smaller ones. (These may have been *Hyperina*, see note on Thomas Edward, 1868.) On pages 96–97, under the heading *Squilla minima*, he gives the following, § ix.: "Ex *Squillis parvis* et nomine fere carent. Germ. ein Zwergfrebslein / ein kleiner Gernier quibusdam ἐγλώροι [read ἔγχλωροι] a colore subfulvo, coctæ tamen rubescunt, χλωρὸς namque viridem, modo luteum colorem Græcis Significat. Ob exiguitatem Vascones *Cicade* quasi Avenam vocant, quas e Garuma copiose extrahunt, et pugillatim devorant, sicut avenam veterinæ. Coci quidam vocant *Brara*, quæ vox itidem Avenam significat, *dividitur* in illam, l, quæ Romæ *Gambaretta* dicitur.

"2. Quæ *Gambaruccio*, estque adeo exigua ut mille vix unam libram æquent. *Squillis affine Animalculum* memorat *Schoenfeld, p. LXXIII.* piscatoribus infestum, quod ad mare Balthicum vulgus nominat Scheffte seu Sprockworm / squillis minimis figura respondens, crustaque instar illarũ contectum, vix transversum digitum longum retibus et tendiculis, quibus hami affiguntur, mire noxium, quæ magno piscatorum detrimento arrodit."

It may be noted that at this date the Crustacea are not included among the Insecta. For *Animal* being divided into *Perfectum*, *ἔναιμον sanguine præditum*, and *Imperfectum*, *ἄναιμον exsanguine*, quod non habet sanguinem proprie sic dictum, sed humorem alium proportione sanguini respondentem, the subdivision of *Imperfectum Animal* seu *exsanque* is made as follows:—"1. In *Insectum* ἔντομον, quod corpus incisuris distinctum habeat: 2. In *molle*, quod molli cute contectum *μαλακόδερμα*. 3. In *crustaceum*, quod tenui crusta obtectum *μαλακόστρακον*: 4. In testaceum, dura testa obtectum, *ὀστρακόδερμα*" (pages 76–78).

1675. Martens, Friderich.

Friderich Martens vom Hamburg Spitzbergische oder Groenländische Reise Beschreibung gethan im Jahr 1671. Aus eiguer Erfahrunge beschrieben / die dazu erforderte Figuren nach dem Leben selbst abgerissen / (so hierbey in Kupffer zu sehen) und jetzo durch den Druck mitgetheilet. Hamburg. Im Jahr 1675.

The fifth chapter, p. 83, is headed "Von etlichen Schild geschlechtern / so auff Grön landischen / oder Spitsbergischen Reisen gefangen werden." Among these he distinguishes *Krabben* and *Sternfische*. Of the *Krabben* he had met with four kinds, first, the *Meerspinne* as the French call it, next, *rothe Krabben oder Garnellen*, thirdly, *kleine graue Krabben oder Granat*, and fourthly, *die so genandte Wallfischs Lauss*. In describing the two last of these, Martens has the distinction of having been, so far as is known, the first to give anything like a definite description of an Amphipod. For this reason the accounts of his third and fourth species seem worth giving in full, as also for other reasons the account of number two. They read as follows:—

2. Garnell. Unter den Garnellen die man hier siehet und die man in Spitzbergen findet is kein Unterschied. Spitsbergische aber seynd von Farben auch ungekocht roth / rother wie die von Lübeck gekocht zu uns gebracht werden. Der Kopf ist sonderlich / bestehet von

etlichen Stücken und hat vier Hörner / der ganze Kopf ist breit an zu sehen / wie eine Kornschauffel ohne Stiel. Am Ende des Kopfs sitzen ihm seine Augen erhoben aus dem Kopffe wie Krebs Augen. Er siehet nicht unterwerts / sondern forn aus und von der Seite. Das Schild auff dem Rucken ist Eines Harnisches Rücktheile am gleichsten ist auch hinter dem Kopffe als in seinen Nacken ein wenig eingebogen / und gar wenig pucklich / dahinten sitzt ein Stachel. Darnach folgen sechs Schilde wie die Schilde an den Harnischen an den Armen und Beinen / umb die Ecken desselben sitzen kleine schwarze Pflecklein / als wenn es Nägel an Harnischen seynd. Die Schilde liegen recht rundlich auff einander / wie die Striche und erhobene Theile an den Köpffen der Regenwürmer. Wann er den Schwantz unter sich ziehet / so erscheinen die Schilde hinten zu etwas eingekerbet mit noch einen erhobenen Theil dahinten. Der Schwantz ist von auch fünff Theilen / wann er den ausbreitet ist er wie ein Vogel Schwantz. Hat fornen zwo Scheren / davon der foderste Theil einer Zahnbrecher Zangen am ähnlichsten siehet / haben Zacken gleich daran. Hat 18. Beine / davon die neehsten an den Scheren die kürtzten und dünnesten. Die fodersten 8. Beine haben vier gleich / davon das höchste das längste / und das unterste das kürtzte ist / seynd gantz nicht haricht oder rauch. Die zehen hintersten Beine davon die fodersten die längsten / und das oberste gleich viel dicker und kürtzer als die untersten langen seynd / haben zwey gleich / davon die Füsse etwas untenwerts gebogen und harig sind. An dem hintersten fodersten gleiche stossen herauss zwey Schossen / unten an dem andern nur ein. Er schiest gar schnelle fort im Wasser. Er war so gross / wie ich ihm nach dem heben abgerissen. Sie seynd der Vogel Speise / wie oben bey den Vogeln beschrieben ist. Denn ich hier vorstelle; bekam ich von ungefehr / da eine Lumbe über unser Schiff flog / und einen auff des Schiffs Deck oder Boden fallen liess / wie droben bey den Lumben beschrieben ist.

"3. Kleiner Garnell. Ich habe auch gemercket auff der Spitsbergischen Reise / ein geschlecht von Krabben so den Würmern gleich ist. Der Kopff ist einen Fliegenkopff am ähnlichsten. Hat fornen unten am Kopff zwey Hörner ausstehen. Hat Schilde wie die breiten Maurwürmer. Ist rund auff den Rücken / unterwerts breit. Hat in allem 12 Beine. An jeder seite der fordersten Schilde hat er drey Beine. Vier Schilde vorbey sitzen an jeder seite noch drey beine. Seynd nicht grösser als ich sie abgerissen. Die Vogel fressen sie als ihr angenehmste Speise / welches ich daher schliesse / weil sie sich häuffig funden an den Orten da diese Würmer sich hatten. In dem Dänischen Hafen fand ich sie häuffig / zwischen und unter den Steinen im Wasser wenn man die Steine auffhebete. Hernach den 8. July bekam ich sie in dem Muschel Hafen / darnach dieser nach dem lebend abgerissen. Ich habe sie auch in des Wallfisches Samen der auff dem Wasser trieb vermenget gefunden. Tab. P. gezeichnet mit C.

Fig. 2.

"4. Die so genandt Walfisches Lauss. Die so genandte Wallfisches Lauss hat mit der Lauss ausserhalb des Kopffs kein gemeinschafft / gehört mehr zu den Krebs geschlechten. Seynd hart von Schilden wie Krabben. Haben einen Kopff fast wie eine Lauss / mit vier hörner / seynd beyde von ansehend als ein doppelter A. Die zwey kurtzen hörner von fornen ausstehen / haben zwey knöpff fornen als Paucken stöcke / und die zwey andern krummen hörner seynd fornen spits. Der Kopff hat meist die gestalt einer Eicheln / ist hinten tieff abgeschnitten. Hat zwey augen, Ein Nasen loch. Der Halss ist nicht steiff vom Schilde / sondern von Haut als die Haut zwischen Krebsschilden. Hat sechs Schilde auff den Rücken. Das forderste Schild siehet aus wie die Spuhle (Schehtspule genand) damit die Leinweber den Fadem werffen. Die andern drey als das Weissbrod / so wir Pfunnelcken nennen. Die zwey hintersten seynd am aller ehnlichsten einem Schilde. Den Schwantz konte man wohl einen Schilde vergleichen / ist aber gar kurtz. An den fodersten Schilde hat er die Füsse / von Gestalt wie eine krumme Meyer Sense / seind vornen rund gebogen

wie ein viertel von Mond / inwerts aber auf die Helffte mit Zacken wie eine Zâge / und vornen ein spitziger krummer Klaue. An des andern und dritten Schildes jeder Seite stehen heraus vier Keulen als seine Ruders / haben unten ein kurtz Glid / darinnen seine Ruder beweget werden / die Keûlen legen sie kreutzweise ûber den Rûcken wan sie vom Walfische fressen / oder sie legen sie also an einander in die höhe / wie die springer wann sie ûber Degen springen. Die sechs hintersten Beine / seynd von gleichen als Krebsbeine / haben an jedem Bein drey gleiche / davon die fordersten gekrûmmet wie ein viertel Mond / fornen aber seind sie gantz spitz wie eine Nadel / so dass sie feste so wol Menschen als in des Wallfisches haut fassen können (wie die Filtzlâusse / daher ihnen auch der Nahme Lauss gegeben) dass man sie in stûcken zerschneiden muss / ehe man sie von der Haut reissen mag. Oder wer sie lebendig begehret / muss sie mit der Walfisches haut heraus schneiden. Sie sitzen den Wallfischen an gewisse Orter des Leibes (als zwischen den Flossfedern oder Finnen / an der Scham und Lefftzen / da er sich nicht wol reiben mag / und beissen ihm stûcke aus der haut / als wann die Vogel von ihm gefressen hâtten. Etliche Wallfische haben sehr viel Lâusse / etliche haben nicht eine / je wârmers ist je mehr lâuse bekommen sie. wie ich von andern vernommen. Den ich hier vorstelle habe ich abgerissen in den Muschel hafen den 7. Julii. Tab. Q. gezeichnet mit d."

Fig. 3.

On page 58, in describing the "Lumbe," he says, "In ihren Magen habe ich gefunden kleine Fische und rothe Garnellen / und etliche Sandsteine. Wie ich dann solche vollenkomlich erkant / nachdem eine Lumbe im fliegen eine grosse rothe Krabbe auff das Schiff fallen liess / welche ich auch an gemeldten Orthe abgerissen."

The woodcuts are copied from the figures given by Martens in his Plates P. and Q.

It seems quite obvious that the *Garnell*, number 2, with the eyes raised out of the head like *Krebs Augen*, and with eighteen legs, and capable of being described as a great red *Krabbe*, cannot have anything to do with a *Caprella*. On the other hand these rather curious circumstances are to be noticed: first, that while the description of "Garnell" refers to a life-size figure which is not to be found, the figure *i* on Plate P. is left without any description; secondly, that a copy of this figure, with the word "Garnell" attached to it in a peculiar manner, as if to avoid all possibility of mistake, is given by Adelung in 1768 to accompany his modernised version of Martens, and is definitely referred to the description of "Der Garnell," while, lastly, Herbst, Nat. der Krabben and Krebse, II. 142–144, under "Cancer (Gammarellus) *linearis*," refers to "*Martin Spizberg, tab. B. fig. I. p. 115*, Granat," and winds up his account of this species with the words, "Die Vögel fressen diese Thiere als ihre liebste Speise, und halten sich häufig an denen Orten auf, wo man die findet. Man trifft sie aber vornemlich in den Häfen zwischen und unten den Steinen im Wasser, und auch in des Wallfisches Saamen an, der auf dem Wasser treibt," thus adding to the perplexity by combining a reference to figure *i* with words obviously borrowed from the account that applies to figure *c*. Boeck is of opinion that the figure *i* represents *Caprella septentrionalis*, Krøyer, on the ground that no other *Caprella* is found at Spitzbergen. Mayer, Caprelliden, p. 2, does not accept Boeck's argument, and considers that, as the species represented is undescribed, it would be undeserving of further notice, but for the reference to it in Linnæus.

Fig. 4.

The *Kleiner Garnell*, number 3, being found among and under stones, may in Boeck's opinion be *Gammarus locusta*, that being found in such situations at Spitzbergen.

Since the Wallfisch of Martens is known to be the Greenland Whale, *Balæna mysticetus*, Lütken

infers that its parasite must be that which he has named *Cyamus mysticeti*, rejecting the name *Cyamus ceti*, as having been applied confusedly to several species. Though Martens drawing of this species, Plate Q, fig. *d*, is a very odd one, the description is vouched for by Lütken as being in many points correct, and in any case such as should have prevented later writers from confusing the species with the Pycnogonidæ.

1705. Ray, John, born 1628, died 1704 (1705 or 1707). "His proper name is Wray," H. A. Hagen, Bibl. Entom.

Methodus Insectorum seu Insecta in *Methodum aliqualem* digesta: a Joanne Raio. Londini, cIↃIↃccv.

"Insecta," he says, "sunt vel *ἀμεταμόρφωτα*, hoc est, quæ nullam subeunt formæ mutationem; vel *μεταμορφόμενα*, hoc est, quæ formam mutant.

"Insecta *ἀμεταμόρφωτα* sunt vel *Ἄποδα* seu *Pedibus destituta*, vel *Pedata*. Ex his nonnulla pellem aliquoties mutant."

Under "Insecta *ἀμεταμόρφωτα* Pedata," he says:—

"Hæc pro numero pedum dividi possunt in 1. Hexapoda, 2. Octapoda, 3. *Τεσσαρεσκαιδεκάποδα*, 4. *Πολύποδα*."

The third group he thus describes:—

"3. *Τεσσαρεσκαιδεκάποδα*, seu 14 pedibus donata, Aselli, quorum tres species novimus, 1. *Maritimus* est, in rupibus degens, reliquis major et longior. 2. *Lividus*, qui in globulum se convolvit, Angl. Wood-lice and Sows and Chess-Pugs. 3. *Asininus*, caudâ bifurcâ, minùs gibbus quam *Lividus*, nec in globum se colligens. His addenda, 1. *Asellus marinus* figuræ brevioris, in globulum se convolvens. 2. *Asellus aquarum dulcium*, binas habens in cauda setas, crura longiora. 3. *Pulex aquaticus*, squillæ nonnihil similis, saltatrix, tum in aquis salsis, tum in dulcibus degens. 4. *Pediculus aquaticus*, piscibus infestus, quibus adhæresciit. Hujus datur species caudata, duabus sc. in cauda productioribus setis."

The *Πολύποδα* contain Terrestria, *Julus* and *Scolopendra*; Aquatica, the Cornish Pugs, with 38 feet, *Scolopendra marina*, and *Animalculum bicorpor* seu *bicaudatum*.

The account of the *ἀμεταμόρφωτα* he concludes with the words, "Hanc Methodum Insectorum intransmutabilium D. *Francisco Willughby* debemus." This explains the initials F. W. in the following notice.

1710. Ray, John.

Historia Insectorum. Opus posthumum, jussu Regiæ Societatis Londinensis editum. Londini, M.DCC.X.

On pages 43, 44, the following notices are given:—

"*Pulex marinus cornutus. F. W.* Ad Asellos referendus. Numerus annulorum ex quibus corpus componitur 12. Pedum utrinque 7, ex quibus ultimi cæteris longiores, ante caput duo longa ingentia cornua. Corpus ¼tam unciæ æquat. Ad radicem cornuum majorum duo alia minora sunt. Pinnulas natatorias habet. Coloris est subalbidi, figuræ tenuis et angustæ.

"*Pulex marinus Bellonii de Avibus, Mouffeti et Gesneri, an Squillæ minimæ fluviatiles? F. W.* Asellis similis est, sed gracilior et rotundior, pedésque multò longiores habet. Color in dorso spadiceus. Oculi nigri: Antennæ articulatæ, ab eodem puncto prodeuntes, quos

directè antrorsum extendit; ad quarum radices aliæ duæ, multò breviores. Corpus ferè pellucidum, celerrimè movetur saltando ut Pulex, sed præcipuè extra aquam. Pedum secundum par chelarum instar latum. Inter pedes et caudam alia sunt sive Appendices, sive pedes, graciles et breves quibus ova adhærere probabile est ut in Locustis. Cauda cirrorum fasciculo constat. In litoribus sub lapidibus innumeræ inveniuntur.

"*Pulex fluviatilis*, q. *An à marino differat*. *F. W.* Pedum quinque paria posteriora longa et gracilia sunt, duo capiti proxima breviora, non chelis sed (ni fallor) hamulis donata, ut in Squillis. Juniores matribus adhærent, quæ in circulum ferè se contorquent, et pullos amplectuntur. A capite duo procedunt Antennarum paria. Quæ in nostris rivulis sunt, non saltant ut marinæ, sed incurvant se et natant podicem exerendo satis celeriter. Hæ in aquis calidis in specu *Custozæ* prope *Vincentiam* in *Italia* inveniuntur, ubi nulla animalia vivunt."

Of these three notices the first probably refers, as pointed out by Pallas himself, to *Oniscus volutator*, Pallas, 1766; the second, to judge by the short upper antennæ, the large-handed second feet, and the saltatory motion, especially out of water, no doubt principally refers to *Oniscus gammarellus*, Pallas, though the attendant query implies that species of *Gammarus* were also in view; the third notice evidently includes two species, that from the warm springs of Custoza in Italy being, Boeck says, *Gammarus pungens*, while the other is obviously the common fresh-water *Gammarus pulex*.

1728. Frisch, Johann Leonhard, born 1666, died 1743 (Hagen).

Beschreibung von allerley Insecten in Teutschland, Nebst nûtzlichen Anmerckungen Und nôthigen Abbildungen Von diesem kriechenden und fliegenden Inländischen Gewûrme, zur Bestâtigung und Fortsetzung der Grûndlichen Entdeckung, So einige von der Natur dieser Creaturen herausgegeben, und zur Ergântzung und Verbesserung der andern. Siebender Theil. Samt einer Vorrede, darinnen von Ulyssis Aldrovandi Buch von den Insecten ausfûhrliche Meldung geschicht. Berlin, 1728.

In part vii., section xviii., page 26, is headed "Vom Krebs-formigen Wasser-Wurm." Of this he says, "Der grôsste wird etwan Zoll-lang die Übereinkunfft mit Krebsen, der Gestalt nach, leidet gar wohl, dass man ihm davon einen Nahmen giebt, weiler noch keinen hat." With the longer upper antennæ he thinks it feels what is in front of and beside it, with the smaller lower ones it feels what underneath might do it harm or supply it with food. He concludes that it cannot be one of the insects which undergo further transformation. Its fresh-water habitat, and the figures which Frisch gives, justify Boeck's opinion that *Gammarus pulex* is here in question. It is depicted on pl. xviii. figs. 1, 2, 3. The whole plate is reproduced in the accompanying woodcut.

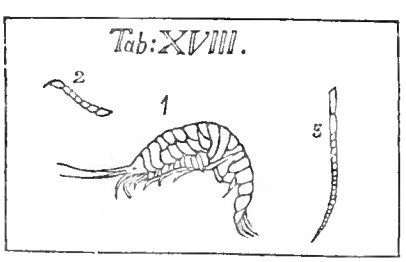


Fig. 5.

1734. SEBA, ALBERT, born 1665, died 1736 (Biographie Universelle).

Locupletissimi rerum naturalium Thesauri accurata descriptio, et iconibus artificiosissimis expressio, per universam physices historiam. Opus cui, in hoc rerum genere, nullum par exstitit. Ex toto terrarum orbe collegit, digessit, descripsit, et depingendum curavit Albertus Seba. Tomus i. Amstelædami, MDCCXXXIV.

On page 142 he gives *Pediculi ceti*, Poux de Baleine, with a sailor's story that they slip into the ears of the whales and pierce them with their bite. Lütken says that the figures, pl. xc. fig. 5, E, F, G, H, may with tolerable certainty be referred to *Cyamus mysticeti*, *i.e.*, to the *Cyamus* which infests the Nordhval (a whalebone Whale, known in English as the Right-whale, the Greenland Whale, or the Common Whale), *Balæna mysticetus*, and that E, F represent a male, G a female, and H a young male. The "quatre pieds au milieu longs et menus" are drawn as if articulated.

1735. LINNÉ, CARL (also Carolus Linnæus, Carl von Linné, and, in Trapp's translation of Stoever's Life, Sir Charles Linnæus), born 1707, died 1778.

Systema Naturæ, systematice proposita per Classes, Ordines, Genera, et Species. Lugduni Batavorum, MDCCXXXV.

In the Regnum Animale, the fifth of the six classes is devoted to the Insecta, "*Corpus* crusta ossea cutis loco tectum. *Caput* antennis instructum." This class includes the Coleoptera, Angioptera, Hemiptera, and Aptera ("alæ nullæ"). The Aptera contain the divisions or genera, "Pediculus, Pulex, Monoculus, Acarus, Araneus, Cancer ("*Pedes* 12, *priores* cheliformes"), Oniscus ("*Pedes* 14"), Scolopendria." CANCER contains the species "Cancer, Pagurus, Majas, Gammarus, Astacus, Squilla, Eremita." ONISCUS contains "Asellus *Officin.* Asellus aquat."

1738. LINNÆUS.

Animalia per Sveciam observata.

In this work the pages are headed Scient. Svec. A.MDCCXXXVI. Among the Aptera under *Cancer* are given, besides *Cancer marinus*, *Maja*, *Astacus*, *Gammarus*, four short descriptions of species of *Cancer*, and the name "Cancellus, *Matth. Diosc.*, *230*," corresponding probably to what he elsewhere calls *Eremita*, *Cancellus* being Swammerdam's name for Bernard l'Hermite, in 1681.

1740. LINNÆUS.

Systema Naturæ. Editio secunda, auctior. Stockholmiæ, 1740.

The Regnum Animale has six classes: Insecta the fifth, "*Corpus* ossibus cutis loco tectum, *Caput* antennis instructum." The Insecta include four orders, the Aptera, "alæ nullæ," being the fourth. These comprise the genera, "Pediculus, Pulex, Podura, Monoculus, Kermes, Acarus, Aranea, Scorpio, Cancer, Oniscus, Scolopendra." CANCER ("*Pedes* X.; *primores*

cheliformes. Oculi duo. Cauda foliosa") includes "Cancer, Pagurus, Majas, Gamarus Astacus, Squilla, Eremita." Oniscus (*Pedes* XIV.) includes "Millepes, Asellus aqu."

With the above agrees Editio quarta ab Auctore emendata et aucta. Parisiis MDCCXLIV.

In a German edition, Halle, 1740, with a preface by Johann Joachim Langen, *Cancer* is defined "*Pedes* 12, *priores* cheliformes. Mit 12 Füssen, da die vordersten Scheren sind." The German explanation of *Gammarus* is "Der kleinste Krebs mit langen Schwanz (Spring-Krebs"), as though *Gammarus* were an Amphipod, which in the intention of Linnæns it clearly was not. According to Herbst, Krabben und Krebse, ii. pp. 42, 43, "Cancer (Astacus) *gammarus*" is the great common lobster, which from the Greek κάμμαρος, through the Latin Gammarus, derived its name in Danish *Hammer*, in German *Hummer*, in French *Homar* (later *homard*).

1741. Egede, Hans, born 1686, died 1758 (Biographie Universelle).

Det gamle Grønlands nye Perlustration, eller Naturel-Historie, og Beskrivelse over det gamle Grønlands Situation, Luft, Temperament og Beskaffenhed, &c., &c. Kjobenhavn, 1741.

Cap. vi. p. 36, is headed "Hvad Slags Diur Fiske og Fugle den Grønlandske, Søe giver af sig etc." The accompanying plate contains a figure of a Hvalfisk, with a minute reproduction having the words "pag. 39, 1 : 24" above it, and below it "Hvalf : luus" and a figure of that creature, which is obviously borrowed from Martens. On page 39, where the smallness of the creatures which form the food of the whale is contrasted with the size of the whale itself, the author says, "Nu skulde mand tenke at saa stor en Krop maa nodvendig behøve mange andre Fiske og Søe-Dyr til sin Føde ; men hans spise er intet uden noget som kaldes Hvalfiske Aas, af Skikkelse og Storelse som i Figuren sees, det er brun af Farve haver 2. smaa Flosser hvormed det beveeger sig i Vandet, dog saa langsomt, at man kand osse dem op af Vandet med Haanden, som med et Øsse-Kar. Dette Slags Aas er veigt, Saa naar man rivet det imellem Fingrene, er det som Fet eller Thran." From which it may be supposed that Egede has confused the *Cyamus* which feeds on the whale with the Gammarids or other small fry on which the whale feeds.

Fig. 6.

1743. Klein, Jacob Theodor, born 1685, died 1759 (Biographie Universelle), died February 27, 1760 (Hagen).

Summa dubiorum circa classes Quadrupedum et Amphibiorum in celebris domini Caroli Linnæi systemate naturæ : sive naturalis Quadrupedum Historiæ promovendæ Prodromus cum Præludio de Crustatis. Lipsiæ. Gedani, 1743.

In the "Præludium de Crustatis in specie de Squillis et Insectis Malacostracis Maris Balthici ubi et de Oniscis," he says, p. 32, "*Primi* generis malacostraca sunt ; Cancri. Gamari. Squillæ. Secundi : Entoma sive Insecta Crustata." On p. 34, the Squillæ, which he identifies with καρίς and καρίδιον of Aristotle, are thus defined :—"Squillæ sunt malacostraca, *corpore* prælongato, qvadantenus *gibbo;* quatuor calcaribus cheliformibus, *d/cruribus* octo, in exitu aculeatis, *cauda* tabellata.

"d/ Allucinati sunt autores, qvi Sqvillarum brachia forcipibus sive chelis carentia scripserunt ; conferantur figuræ, quas ad vivum fieri fecimus. Error inde enatus, quod locustas, *ursa*

dictam, et *locustam cælatam* squillis adnumerarunt, cum sqvillæ habeant pedes una cum brachiis *duodecim*, ursa vero et locusta cælata *decem*."

On p. 35 he tells us, "Squillarum *maris balthici* non nisi *duas*, ad summum, si *saltatricem* connumeraverimus, *tres* habemus species." The first two, *Squilla fusca* and *Squilla cinerea* ("An, sqvilla parva Rondeletii?") are Podophthalma; the third is thus described, p. 36, "*Sqvilla saltatrix;* Sqvilla parva, quæ major nunquam effici potest, *Wottonus fol. 207.* ex cinereo flavicans; minima; retibus et hamatili piscatui fatalis. Uberrima hujus seges est in littoribus, qvam, tanqvam pestem, qvodammodo mitigantes gallinulæ aqvaticæ, scolopaces, similesque aves vermivoræ avide sectantur; Pulex marinus, *Rondeletii*, quem Ψύλλον Θαλάττιον *Aristotelis* s. pulicem marinum esse autumat; *Helensibus:* Sandspringer. Huic similis videtur D. *Frischii* de insectis Parte vii. num. xviii. frebsförmiger Wasserwurm aquæ dulcis et uliginosæ. Pulices marinos vel saltatrices sqvillas ad vivum delineandos præterita æstate neglexi, interim tamen Niedenthalii icones ab Excell. Breynio communicatas trado: fig. δ. ε. ζ." He hesitates, as he well might, to guarantee the exact accuracy of the figures. The short upper antennæ make it clear that we have to do with Orchestidæ. Fig. ε rather points to a *Talitrus*. No dilated hands are shown in any of the figures.

1745. Linnæus.

Ölandska och Gothlandska resa på riksens Höglofliga Ständers befallning förrättad år 1741 med Anmerkninger uti Œconomien, Natural-Historien, Antiquiteter. Stockholm och Upsala, 1745.

He describes *Cancer pulex fluviatilis*, p. 96, which he found on the strand at Oeland. From the mention of oblong red blotches on the sides of the segments, Boeck conjectures that this may be *Gammarus marinus*. Bate and Westwood, it may be noticed, regard the red spots on the sides as a distinguishing mark of *Gammarus locusta*, Brit. Sess. Crust., vol. i. p. 380. The *Cancer macrourus coeruleus thorace articulato*, p. 260, which Linnæus found on the shore in Gottland, may in Boeck's opinion be *Gammarus locusta*. Hans Ström, in 1765, expresses the opinion that Linnæus has here given two descriptions for one species. Bate and Westwood and Boeck alike refer to the *coeruleus* species of p. 260 as a synonym of *Gammarus locusta*, while the species of p. 96, with the red blotches, is not given as a synonym of any species either by Boeck or the other authors. The observation of Bruzelius, that *Gammarus locusta* is the only species of *Gammarus* which occurs in Gottland, is a negative argument on which but little stress can be laid.

1746. Linnæus.

Fauna Suecica sistens Animalia Sveciæ Regni, &c. Lugduni Batavorum, 1746.

The two last species of the genus *Cancer* are thus given:—

"1253. Cancer macrourus rufescens; thorace articulato. Raj. ins. 41. Pulex fluviatilis. Frisch. germ. 7. p. 26. t. 18. Vermis aquaticus cancriformis. It. oel. 42, 96. Cancer Pulex fluviatilis dictus. Habitat ad littora maris vulgatissimus.

"1254. Cancer macrourus cæruleus; thorace articulato. It. gotl. 260. Habitantem vidi ad montem *Thorsburg* in mari juxta Gotlandiam. Obs. Præcedenti major: totus cæruleus, *rostrum* nullum prominens, *corpus* 14 articulis. *cauda* trifolia; intermedio subulato."

Both of these, in Boeck's opinion, refer to *Gammarus locusta*, the references to Ray's and

Frisch's fresh-water forms being out of place. But, since under 1253 the reference to the Iter Oel. and the word "rufescens" imply that the shrimp with the red blotches, of the Ölandska resa, p. 96, is in question, Boeck can hardly be right in calling it in one place *marinus* and in the other *locusta*.

1747. Linnæus.

Systema Naturæ. Recusum et societatis, quæ impensas contvlit, vsvi accommodatum curante Mich. Gottl. Agnethlero Saxone Transilvano. Editio altera auctior et emendatior. Halæ Magdebvrgicæ. clɔ Iɔ ccxxxxvii.

For *Cancer* this fully agrees with the edition of 1740, and, as in the German edition of that date, against "Gamarus" is placed "kleinste Krebs mit langem Schwanz (Springkrebs)."

1748. Linnæus.

Systema Naturæ. Editio sexta, emendata et aucta. Stockholmiæ, 1748.

In this, as in previous editions, the Animale Regnum has six classes, the Insecta being the fifth, which is divided into seven orders, of which the Aptera, "alæ nullæ," are the last. This contains eleven genera, *Pediculus, Pulex, Podura, Monoculus, Acarus, Aranea, Scorpio, Cancer, Oniscus, Scolopendra, Julus.* "Caucer" contains eight species, *Cancer, Pagurus, Majas, Gammarus, Astacus, Squilla, Eremita, Pulex aquaticus.* 'Oniscus" has three, *Entomon pyramidale, Millepes, Asellus aquaticus.*

Cancer is defined as having "Pedes X: *primores cheliformes.* Oculi II. Cauda *foliosa.*"

A copy of this edition was published Lipsiæ, 1748.

1749. Klein, J. T.

Jacobi Theodori Klein Historiæ Piscium Naturalis promovendæ Missus quintus et ultimus de Piscibus per branchias apertas spirantibus. Gedani, 1749.

In the Fasciculus Septimus, on Callarias (Gadus, Morrhua, the Cod), he says, page 9, "Delectantur Callariæ *squillis* cinereis (*prælud. de crustatis*, p. 36) & *pulicibus marinis;* Horum meliores figuras snperaddimus *Tab. IV.* f. A. naturalis magnitudinis. C sub vitro auctus sed pedibus mutilus, B vero exacte animalculum repræsentat." He then proceeds, with a reference to "*Kilianus Slobæus* (Act Suec. 1733. p. 79)," to retract the opinion expressed in his earlier Præludium, "quod nullum insectum crustaceum, nedum καρκίνιον Aristot. exuvias suas deponat, neque *cancri* neque *astaci marini.*" His figures evidently refer to *Gammarus locusta*, although, as Boeck notices, the secondary flagellum is not given, nor the eye correctly drawn.

1751. Linnæus.

Skånska resa, på höga Ofverhetens befallning förrättad år 1749. Stockholm, 1751.

The *Pulex fluviatilis* which Linnæus found skipping about on the strand like a grasshopper, is clearly, Boeck says, *Orchestia littorea.* It must therefore be distinguished from the *Cancer*

pulex fluviatilis of the Ölandska resa, but there is always the possibility that Linnæus may have given the name *fluviatilis* from having observed a true *Gammarus pulex*, may have described the red blotches from a *Gammarus locusta*, and in the statement, Faun. Sv. 1253, "Habitat ad littora maris vulgatissimus," as well as in this work, may have been referring to the Orchestidæ.

1751–3. Steller, Georg Wilhelm, born 1709, died 1745 (Biographie Universelle), died 1746 (Hagen).

Novi Commentarii Petropolitani, t. ii. pp. 298, 324, and 330. 1751.

Georg Wilhelm Stellers ausführliche Beschreibung von sonderbaren Meerthieren, mit Erläuterungen und nöthigen Kupfern versehen. Halle, 1753.

The passages from the Latin account, 1751, are quoted by J. F. Brandt, 1849. They fully agree with the German rendering, 1753, except that where the German says, "der Brustring stehet eine halbe Linie vor," the Latin says that this (which probably means the second peræon-) segment "dimidiam lentem refert."

At page 106 of the Beschreibung, Steller says, "Die Meerkuh wird von einem besondern Ungeziefer, welches gleichsam eine Laus ist, geplaget. Dasselbe hält sich in den runtzlichen Füssen, in den Brüsten, in der Wartze an heimlichen Orten, im Hintern, und in *chagrin*—ähnlichen Hölen der Oberhaut in grosser Menge auf. Indem sie auch die Oberhaut und Unterhaut durchlöchern, so entstehen von der auslauffenden wässerigen Feuchtigheit Wartzen, die hin und wieder zu sehen sind. Allein diesen Insecten stellen hinwieder die Meermöven (*Lari*) nach," which kindly pick them off the creature's back.

"Dieses Ungeziefer ist mehrentheils einen halben Zoll lang, voll Ringe und sechsfüssig, weiss oder gelblich und durchscheinend. Der Kopf ist länglich und spitzig, grösser als der Saamen von Hirsen. Vor den Stirn sind zwey kurtze knotige Fühlhörner, welche eine halbe Linie lang hervor gehen. Anstatt des Unterkinnbackens hat es zwey dünne Aermgen, jedes mit zwey Gelencken, wie ein Meerkrebs, am Ende sehr spitzig und wie Nägel; das Uebrige bestehet nach Anzahl der Füsse in seehs Ringen, die querüber gehen, auf dem Rücken gewölbet, und eine drittheil Linie breit sind. Der Ring oder Pantzer auf der Brust ist zweymal breiter, und die Ringe werden immer enger, ie näher es nach dem Schwanze gehet. Der Brustring stehet eine halbe Linie vor; an diesen haften zur Seiten ein paar dicke Scheren mit zwey Gelencken. Eine jede Scheere ist mit einem biegsamen Stachel versehen, womit es in die Oberhaut des *Manati* sehr feste fasset. Die übrigen Füsse sind schlaneker; alle endigen sich mit Stacheln, und werden allmählig kürtzer. Die zwey letzten, welche die kürtzesten sind, laufen aus dem Ringe des Schwanzes; sie sind das Ende vom Körper, und das Thier schiebet sich darauf fort." There are other references at pages 54 and 97 to this parasite upon the (now extinct) Sea-Cow, *Rhytina borealis*. Steller's description, though for the time carefully detailed, is so perplexing that J. F. Brandt proposed to place the creature in a new genus as *Sirenocyamus rhytinæ*. Lütken, 1873, gives a Danish translation of the passage above quoted. He provisionally accepts the species as *Cyamus rhytinæ*, J. F. Brandt, while agreeing with Brandt's suggestions that it may be some *Proto*-like form, or a link between the Cyamidæ and Caprellidæ, and that there may still be a chance of finding some species of *Sirenocyamus* on the still living Sea-Cows, the Dugongs and Manatees.

1754. Linnæus.

Museum Regis Adolphi Suecorum, &c., in quo animalia rariora, imprimis exotica, quadrupedia, aves, amphibia, pisces, insecta, vermes describuntur et determinantur. Stockholm, 1754.

The *Oniscus ceti* may be, Lütken thinks, the *Cyamus* which lives on *Balæna mysticetus*. He quotes the description from p. 89, "Oniscus ovalis, segmentis excepto secundo in medio interruptis ('med afbrutna leder'). Caput parvum." "Antennæ 2, singulæ articulis 4; corpus ovale, magnitudine Ricini, sectum segmentis 7, interruptis in medio, excepto solo secundo. Pedes paribus 7, quorum 1 minutum sub capite, 2 crassius ovatum, 3 & 4 mutica, 5, 6, 7 ovata, uncinata." Seba's figure is referred to. The statement that the segments, except the second, are interrupted in the middle, Lütken considers rather obscure. It seems to allude to their being articulated to one another only by the central portion, while between the first (cephalothoracic) segment and the second segment there are no such lateral interspaces.

1755. Rôsel von Rosenhof, August Johann, born 1705, died 1759 (Biographie Universelle).

Der monathlich-herausgegebenen Insecten-Belustigung Dritter Theil worinnen ausser verschiedenen, zu den in den beeden ersten Theilen enthaltenen Classen, gehörigen Insecten, auch mancherley Arten von acht neuen Classen nach ihrem Ursprung, Verwandlung und andern wunderbaren Eigenschafften, aus eigener Erfahrung beschrieben, und in sauber illuminirten Kupfern, nach dem Leben abgebildet vorgestellet werden von August Johann Rôsel von Rosenhof. Nürnberg, 1755.

He accepts Linnæus's classification of the Crustacea with the Apterous Insects, for the additional reasons that, like insects, they have no bones, that their mouths open and shut not from above and below but from side to side, that they cannot shut their eyes, and that their breathing is not through mouth or nose but through lateral openings in the body (p. 306, mis-pagination for p. 308). Pages 351–357 describe "Die kleine Garneele unserer Flüsse. Tab. LXII." From its agreement with the marine Garneele, Rôsel thinks that the little river shrimp would fitly be called die kleine Flusgarneele, and as the Garneele is called *Squilla* in Latin, he explains that the inscription *Astacus fluviatilis* on his plates lxii. and lxiii. ought to read *Squilla fluviatilis* for pl. lxii., and *Squilla marina* for pl. lxiii. He carefully observed the habits and structure of his specimens of the former, which cannot be confused with *Gammarus pulex*, if any trust is placed in Rôsel's statement, "Vom Leib ist solche ziemlich schmal, und diesen bedecken vierzehen Schuppen, von welchen die sieben hintersten oder letzeren, mitten auf dem Rucken mit rothen scharfen Spitzen versehen sind, welche, wenn sich die Garneele krümmet in die Höhe gehen und hervorragen." Burgersdijk, who discusses the synonymy and characteristics of *Gammarus pulex* with great fulness, retains the name *Gammarus roeselii*, first given to Rôsel's species by Gervais in 1835, but there seems no adequate reason for rejecting the specific name *fluviatilis* given by Rôsel himself.

1756. Brisson, Mathurin-Jacques, born 1723, died 1806 (Biographie Universelle).

Regnum Animale in Classes IX distributum, etc. Parisiis, M.DCC.LVI.

These nine classes are Quadrupeda, Cetacea, Aves, Reptilia, Pisces *cartilaginei*, Pisces *proprie dicti*, Crustacea, Insecta, Vermes. As to Classis VII., he says, "Horum character est Caput antennis instructum : et pedes octo et ultra."

1756. Linnæus.

Systema Naturæ. Editio multo auctior et emendatior. Lugduni Batavorum. MDCCLVI.

The Aptera are the seventh order with the same genera as heretofore. *Cancer* is thus defined "*Pedes* X. vel XX., quorum *duo priores* semper cheliferi. *Oculi* duo stiliformes. *Cauda* foliosa, quandoque longa, interdum brevis." The species are as given in 1748.

1758. Linnæus.

Systema Naturæ. Stockholm, vol. i. 1758. (The eleventh, reckoned by Linnæus the tenth, edition.)

On p. 636 *Oniscus ceti* is described as in 1754, but besides the reference to Mus. Ad. Frid. and to Seba, one is given to Martens. (Lütken.)

1758. Vandelli, Domenico, born about 1732, died a little before the end of the century (Biographie Universelle).

De Aponi Thermis. Patav., 1758.

See Note on Olivi, Zoologia Adriatica, 1792.

1759. Baster, Job, born 1711, died 1775 (Biographie Universelle).

Opuscula subseciva, observationes miscellaneas de animalculis et plantis quibusdam marinis, eorumque ovariis et seminibus continentia. II. Tom. Harlemi, 1759–65.

Natuurkundige Uitspanningen, behelzende eenige Waarnemingen, over sommige Zee-Planten en Zee-Insecten, benevens derzelver Zaadhuisjes en Eijernesten. Haarlem.

The original Dutch and Latin editions do not seem to differ from my own copy, which is a "new Dutch edition," published at Utrecht without date, and of which R. T. Maitland, in 1876, observes that it is "volkomen denzelfden druk als de oorspronkelijke uitgave van 1762 alleen met gewijzigden titel." In the first section of the first volume, pp. 37, 50, pl. iv. fig. 2, A, B, C., Baster describes and figures "a curious little animal found on *Zee-mos*," "mirum animalculum in corallinis," which Boeck thinks is without doubt the male of Linnæus's *Caprella linearis*. Mayer does not feel so sure of this, for Linnæus himself, Syst.

Nat., ed. xii., 1767, gives not *linearis* but *atomos* as Baster's species, defined as "Macrourus linearis articularis, manibus adactylis, pedibus undecim." Mayer remarks that Baster has given to the hand of the second gnathopod an armature of five teeth. In my copy there are only four. He also observes that Baster figures as the tailpiece a protruding portion of

TAB. IV.

Fig. 11.

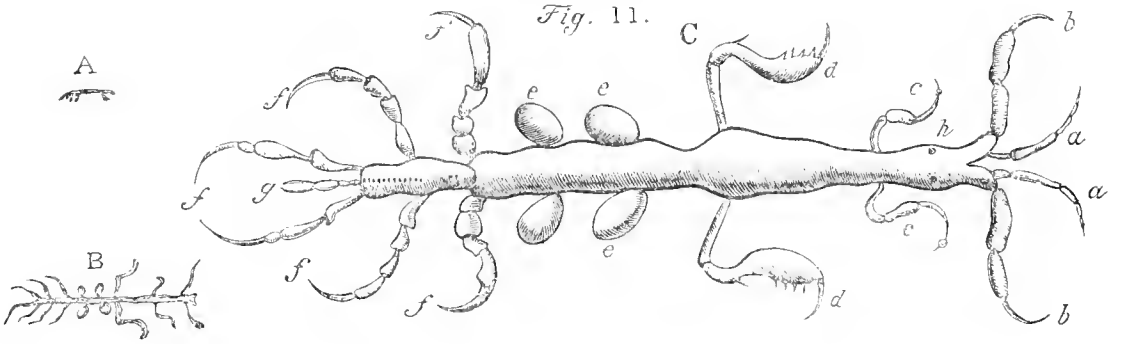


Fig. 7.

the intestinal canal. Probably the eleventh (!) leg in Linnæus' account is due to this supposed tail. The figures from Plate IV., which "I. Rhodius ad vivum pinxit," are reproduced in the accompanying woodcuts. Figures A, B, are the natural size; C, the enlargement of B; "*a*, Deszelfs Antennæ. *b*, Eerste paar pooten;" "*g*, Zyn Staartje en Anus."

1758-1760. SEBA, ALBERT.

Locupletissimi rerum naturalium Thesauri, &c. Tomus iii. Amstelædami. MDCCLVIII. (On the back of the index MDCCLX.)

On p. 55, *Squilla mantis, Amboinensis*, is thus described, "Hæc species, ex Amboina missa, plerumque ad squillas refertur, et hîc locorum quoque inter illas reperitur; licet multo minor sit. Dorsum ejus minime scutatum est; sed testa superior è duodenis constat articulis, carnem continentibus. Barba, itidem geniculata, binos protendit pilos acuminatos binosque alios quasi pennarum æmulos, tandemque duos adhuc breviores. Cæterum et antici pedes gemini magnis instructi sunt forcipibus spinosis; dum pedes reliqui in ungues desinunt, exceptis posticis, utpote qui longis admodum uncis terminantur. Pinnatæ locum caudæ molliculi quidam aculei supplent." This is figured on pl. xxi. fig. 11, and has since been called *Seba innominata*. Boeck supposes that fig. 12 on the same plate is taken from a defective Amphipod, but the description is conclusive against this, as it says among other things, "longiusculi duo tubuli, subcurvi, oculos in fine suo sustinent." The stalked eyes are also figured. The animal in question, which Seba names *Squilla mantis, Amboinensis maxima*, is, he says, called *Kambaretto* by the Italians.

1760. LINNÆUS.

In an edition of the Systema Naturæ, dated Halæ Magdeburgicæ, MDCCLX. (ad editionem decimam reformatam Holmiensem), *Cancer* is the tenth among fourteen genera of the Aptera. It is here defined "*Pedes* utrinque VIII.; præter Manus 2 chelatas. *Oculi* II. distantes, pedunculati, elongati, mobiles. *Palpi* II magni, cheliferi. *Cauda* articulata, inermis." The

last division, headed "Macrouri manibus adactylis, testa thoracis brevissima, nec thoracem totam tegente," contains the following numbered species, 54 *Mantis*, 55 *Scyllarus*, 56 *Pulex*, 57 *Locusta*, 58 *Salinus*, and 59 *Stagnalis*, with the note, "Species 54–59 ob thoracem Lorica destitutum et singularem structuram corporis adeo a reliquis Cancris recedunt, ut facile genus distinctum constituerent." For *Oniscus ceti*, see the note on the edition dated 1758, of which the edition 1760 is a copy.

1760. Gronov, Lorenz Theodor, born 1730, died 1778 (Biographie Universelle).

Acta Helvetica, Physico-mathematico-anatomico-botanico-medica figuris æneis illustrata, et in usus publicos exarata. Volumen iv. Basileæ, MDCCLX.

Pages 31–40 contain "Observationes de animalculis aliquot marinæ aquæ innatantibus atque in littoribus belgicis obviis" by Laur. Theod. Gronovius. Among other things he found, he says, some very minute Crustaceans, seen by the microscope to come near to the creatures which go by the name of *Pediculi Marini*, which Linnæus mixed up with the *Cancri*, though they differ from them toto cœlo. He therefore determines the name and generic marks as for a new genus, thus:—"Squilla. *Corpus* filiforme, articulatum, longum, teres, in dorso reclinatum natans. *Antennæ* subulatæ, articulatæ, quatuor. *Pedes* prælongi graciles quatuordecim utrinque scilicet VII, binis anterioribus paribus cheliferis. *Oculi* duo, ad latera capitis, non stiliformes, simplices utrinque unicus. *SQUILLA* acaudata pedibus quatuordecim. *Fig.* 8, 9. *Caput* rotundum antice depressiusculum superne planum. *Oculi* duo, sphærici, simplicissimi, haud styliformes quemadmodum in astacis cancrisque, utrinque in lateribus unicus. *Antennæ* quatuor, articulatæ, subulatæ, simplices, in antico capite sitæ, per paria dispositæ. Corpus prælongum, teres, articulorum sex, excepto capite. Articulis secundo & tertio in gravidis intra pedes adhæret prætenuis atque utrinque convexa membrana ova includens; qualem exhibui *fig.* 10. *a. b.* qui articuli respondent *fig.* 9. *litteris a. b. Pedes* graciles, longi, in universum quatuordecim, utrinque scilicet septem, horum bina priora paria chelis sunt instructa; reliqui vero pedes sunt subulati natatorii. Singulum par est adnexum articulo. *Chelæ* anticorum pedum sunt monodactylæ, prioris paris non dentatæ, secundi vero dentatæ & aculeatæ. Cauda nulla. Ultimum pedum par corpus terminat. Dum *natat* dorso incumbit atque velocissime ope posticorum pedum per aquas transiens. Color cinereus; Calida tempestate in obscuro lucet dum vivit. Frequentissimum animal in nostro mari." A very good figure, much more accurate than the later one by Slabber of his *Phtisica marina*, accompanies this description, which evidently applies to *Proto ventricosa*, O. F. M.

1760. Godeheu de Riville.

Mémoire sur la mer lumineuse. Mémoires de Mathématique et de Physique présentés a l'Académie Royale des Sciences par divers savants. Tom. iii., Paris, 1760, pp. 269–276.

He gives a figure, pl. x. fig. 6, of a *Caprella* from Ceylon, which in Boeck's opinion may be *Caprella ultima*, Sp. Bate. Mayer, however, finds nothing to justify a more definite determination than that it is the male of some species of *Caprella*. *Caprella ultima*, Sp. Bate, may itself, he thinks, be a synonym of *Caprella æquilibra*, Say. De Riville's figure has what for a *Caprella* would be a long tail, "G. sa queue armée aussi d'un crochet," but it probably only represents one of the hind legs.

1761. Poda, Nicolaus, born 1723, died 1798 (Hagen, Bibl. Entom., calls him Poda von Neuhaus).

Insecta Musei Græcensis, quæ in ordines, genera et species Juxta Systema naturæ Caroli Linnæi digessit Nicolaus Poda. Græcii. Anno, M.DCC.LXI.

On page 121 this author, who lived at Grasse, in the south of France, gives the following description of an animal which he places among the Aptera in the genus *Podura*: "*Maritima. 2. P. oblonga, nitens, ferruginea. *Habitat sub saxis post maris refluxum* Tergesti. Cl. Scopoli *in epis.*" This is referred to by Scopoli under *Cancer locusta*. In the opinion of Pallas, 1772, it is his *Oniscus gammarellus*.

1761. Linnæus.

Fauna Svecica Sistens Animalia Sveciæ Regni: Mammalia, Aves, Amphibia, Pisces, Insecta, Vermes, distributa per Classes et Ordines, Genera et Species, Cum Differentiis Specierum, Synonymis Auctorum, Nominibus Incolarum, Locis Natalium, Descriptionibus Insectorum. Editio Altera, Auctior. Stockholmiæ, 1761.

The entries relating to the Amphipoda are on pages 496, 497, 499–501. Among the Insecta Aptera in the genus *Cancer* are given :—

"2041. Cancer *Pulex* macrourus articularis, rostro acuto manibus adactylis, cauda attenuata spinis bifidis.

" Cancer macrourus rufescens, thorace articulato. *Fn.* 1253. *It. oel.* 42, 96. *It. scan.* 125.

" *Raj ins.* 44. Pulex fluviatilis.

" *Frisch. germ.* 7. *p.* 26. *t.* 18. Vermis aquaticus cancriformis.

" *It. oel.* 42. 96. Cancer Pulex fluviatilis dictus.

" *Sueis* Márta. *Scanis* Sandhare.

" Habitat ad littora maris vulgatissimus, frequens, rodens retia, conficiens sceleta piscium; natat in dorso.

" *DESCR. Pedes* 7 parium, quorum 4 paria antrorsum versa; horum paria antica chelifera digito mobili absque pollice. Pedum 3 paria postrema retrorsum versa.

"2042. Cancer *Locusta* macrourus articularis, rostro obtuso, manibus adactylis, cauda attenuata spinis bifidis.

" Cancer macrourus cæruleus, thorace articulato. *It. gotl.* 260. *Fn.* 1254.

" Habitantan vidi ad montem *Thorsburg* in mari juxta Gotlandiam.

" *Obs.* Praecedenti major: totus cæruleus. *Rostrum* nullum prominens, *Corpus* 14 articulis. *Cauda* trifolia; intermedio subulato."

In the genus *Oniscus* there are given :—

" 2056. Oniscus *Ceti* ovalis segmentis distinctis, pedibus tertii quartique paris linearibus muticis.

" *Martens, spitzb. t. Q. f. D.* Pediculus Ceti.

" Habitat in *Cetis* Oceani.

" *DESCR. Corpus* ovale, 7 articulis distinctis. *Caput*, quod primus articulus, minimum. *Pedes* 1, 2, 5, 6, 7 *chelis* crassis ungue mobili acuto terminati. *Pedes* vero 3, 4 paris filiformes mutici; primum par sub corpore situm est. *Corporis* articuli magis remoti et distincti, quam in reliquis speciebus."

" 2062. Oniscus *bicaudatus* semicylindricus, caudis duabus longitudine corporis.

" Habitat ad littora *maris* Norvegici. *Martin.*

" *DESCR. Corpus* semicylindricum, fuscum, 12 articulis. Pedes utrinque 7, albi, quorum solitarii

postici reflexi. *Caudæ* 2, protentæ, longitudine corporis, 5 articulis; quorum tertius major, longior et crassior; primus et secundus brevis; qvartus et quintus angustiores. Inter has caudas, caudæ 2 aliæ, breves, subulatæ."

Boeck, under the obviously misprinted date 1771, remarks that as number 2041 of this work is identified with number 1253 of the earlier edition, the synonyms from Ray and Frisch, and Linnæus's own Skänska Resa, ought not to have been cited. Lütken calls attention to the improved definition of *Oniscus ceti*. The *Oniscus bicaudatus* must no doubt be identified with the species which Linnæus afterwards called *Cancer grossipes*, the antennæ having been mistaken in the present instance for the tail, as O. F. Müller remarked in 1776. By Willughby and Ray, in 1710, this species was well-named *cornutus*, a name unfortunately excluded as præ-Linnean. The *Astacus muticus* of Gronov, 1762, is only accidentally binominal. The *Oniscus bicaudatus* of Linnæus, 1761, and his *Cancer grossipes*, 1767, must be given up as names founded on egregious mistakes. We are thus led to the *Oniscus volutator* of Pallas, 1766 and 1772, as rightfully determining the specific name. Though the *Corophium longicorne* of Latreille and numerous authors was highly appropriate, the name *Corophium volutator* is sufficiently suitable to an animal which may commonly be seen twisting and turning about at the entrance of its gallery in the mud, and which, according to Pallas, makes similar gyrations when in the water.

1761. Sulzer, Johann Heinrich, born 1735, died 1813 (Hagen).

Die Kennzeichen der Insekten nach Anleitung des Königl. Schwed. Ritters und Leibarzts Karl Linnæus, durch xxiv. Kpf. erläutert und mit derselben natürlichen Geschichte begleitet. Mit einer Vorrede des Herrn Johannes Gessners. Zürich, 1761.

Sulzer gives a figure of Rösel's *Astacus* (*Squilla*) *fluviatilis* on pl. xxiii. fig. 152, and *a*. 4. He describes it on p. 192. On p. 65 of the explanations of the plates he says, "Fig. 152. Krebs, lange Scheeren, gegliedert, Hände ohne Finger, dünn ausgehender Schwanz mit zweenfachen Dörnen. Locusta. Linn. Syst. Nat. Cancer, 57."

1762. Baster, J.

Opuscula, Tom. II. Liber 1, Harlemi, 1762.
Natuurkundige Uitspanningen, &c.

In the first section of the second volume, on pp. 34–36 and 49, pl. iii. figs. vii., viii., 1–6, he describes the hopper or sea-flea, in the vernacular "Een springertje of Zee-Vloo," with references to "Pulex marinus, Klein, Miss. v. Tab. iv. A, B, C.; Seba, Thes. iii. Tab. xxi., N. 11; Linn., Syst. Nat., N. 36. Cancer macrourus, articularis manibus adactylis, canda attenuata, spinis bifidis; Rösel, Suppl. Tab. lxii. p. 351; Frisch, vii. Tab. xvii. 18, p. 26." This in Boeck's opinion is probably *Orchestia littorea*, but Baster's remark that it is found not only in sea and brackish water but also in freshwater rivers and even in ponds, but especially among and under the fronds of *Alga marina*, implies that he did not distinguish the actual creature described from other species such as *Gammarus pulex* and *Gammarus locusta*. His figure may refer to *Orchestia* (*littorea*) *gammarellus*, but if so he has fallen into some confusion in describing the lower antennæ, as well as in the synonymy.

1762. Desmars.

Mélanges d'histoire naturelle. 1762.

From tome i. pp. 217, &c., of this work, Latreille, in his Histoire naturelle, vol. vi. pp. 305–310 (1803), gives a long quotation, fully describing *Gammarus pulex* under the designation of *Cloporte aquatique*. A reference to some of Desmars' observations will be found also in the Brit. Sess. Crust., vol. i. p. 396.

1762. Geoffroy, Etienne Louis, born 1727 (1725), died 1810 (Hagen).

Histoire abrégée des Insectes, qui se trouvent aux environs de Paris; Dans laquelle ces Animaux sont rangés suivant un ordre méthodique. A Paris, M.DCC.LXII. (This edition is anonymous. The work was published with the author's name in 1764.)

In the second volume, under "Cancer. Le Crabe," Geoffroy gives two species, the first being l'écrevisse (*Astacus fluviatilis*), well known in France as an article of food. The second he thus describes, pp. 667–668:—

"2. Cancer *macrourus rufescens, thorace articulato. Linn. faun. suec. n.* 1253. Planch. 21, fig. 6.

Pl. XXI

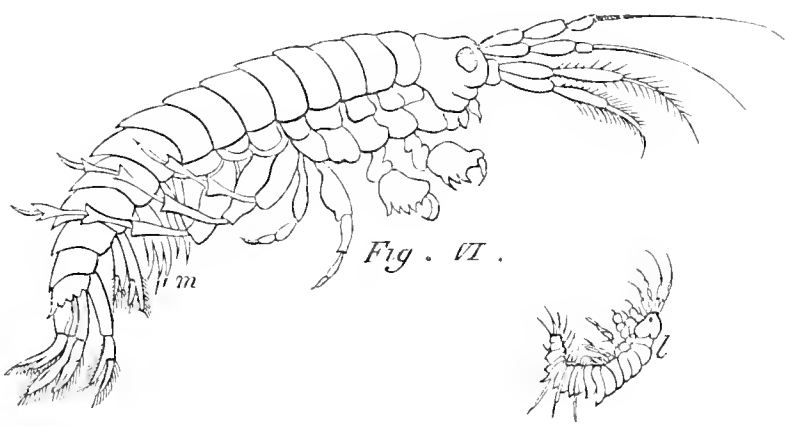


Fig. 8.

"*Linn. syst. nat. edit.* 10, *p.* 631, *n.* 56. Cancer macrourus articularis, manibus adactylis, cauda attenuata spinis bifidis.

"*Raj. ins.*, *p.* 44. Pulex fluviatilis.

"*Frisch. germ.* 7, *p.* 26, *t.* 18. Vermis aquaticus cancriformis.

"*Iter Oeland.* 42, 96. Cancer pulex fluviatilis dictus.

"*Charlet. exercit. p.* 57. Squilla.

" *Merret. pin. p.* 192. Squilla fluviatilis. Squilla parva.

" *Rosel. ins. vol.* 3, *supplem. tab.* 62.

" *La crevette des ruisseaux.* Longueur 7 lignes. Largeur 2 lignes.

" Cette crevette est d'un jaune couleur de rouille; ses yeux sont noirs; ses antennes sont fines et assez longues, à peu près de la longueur des deux tiers du corps. Elle a cinq pattes de chaque côté & plusieurs appendices à la queue. Tout son corps est composé de douze anneaux sans la tête; quatre de ces anneaux composent le corcelet, qui dans l'écrevisse est d'une seule piéce. Cette crevette est applatie par les côtés; aussi est elle toujours posée sur le côté, soit qu'elle se meuve, soit qu'elle reste en place, & lorsqu'elle marche, elle approche par des mouvemens vifs sa tête & sa queue l'une de l'autre.

" On trouve communément cette crevette dans l'eau courante des petits ruisseaux, elle est en grande quantité dans la riviere des Gobelins. Souvent les plus petites se retirent & se mettent à l'abri sous le ventre & entre les pattes des plus grosses."

The figures, life-size and enlarged, are here reproduced. It is obvious that Rösel's species *Astacus* (*Squilla*) *fluviatilis*, is represented, though Geoffroy is probably describing *Gammarus pulex*. Boeck rather singularly remarks, "Denne Afbildung er kopieret af *Sulzer* (253). Tab. xxiii. Fig. 152," the number 253 being a reference to the title of Sulzer's work in 1761, of which Boeck takes no further notice. The figure in question has fourteen segments, independently of head or telson, which is obviously one too many, although in agreement with Rösel's description. The last seven are strongly dentate medio-dorsally. The figure, being a striking one, was frequently repeated, without regard to its accuracy or its fitting the species, the description of which it was supposed to illustrate. Herbst in his large work, Bosc in his small one, alike use it, the former for *Cancer* (*Gammarellus*) *pulex*, the latter for La Crevette des ruisseaux, *Gammarus pulex*. An interesting discussion of the subject will be found in Bate and Westwood, Brit. Sess. Crust., vol. i. pp. 388–396.

Geoffroy shows in the figure a series of seven feet, but does not take the trouble to reconcile this with the definition which he gives of *Cancer*, including "Dix pattes, les deux premieres en forme de pinces." On the contrary, he describes his species as having "cinq pattes de chaque côté." The statement that the body is composed of twelve anuli without the head, is an improvement upon Rösel's account, but all the same not in agreement with the figure.

1762. Gronov, Lorenz Theodor.

Acta Helvetica, Physico-mathematico-anatomico-botanico-medica figuris æneis illustrata, et in usus publicos exarata. Volumen V. Basileæ, MDCCLXII.

Pages 353–382 contain "Animalium Belgicorum a Laur. Theod. Gronovio observatorum Centuria quinta." In this century of animals he describes, "455. Astacus muticus; pede utrinque antico subulato, edentulo, longissimo, crassissimo," of which he repeats the full account in his later work. (See Note on Gronov, 1764.) "456. Squilla cauda nulla" is his *Squilla acaudata* of 1760, to which he refers. "457. Squilla cauda nulla? pedibus quatuordecim, tertio quartoque paribus vesicæformibus natatoriis" is referred to Baster's "Animal in coralliis." "458. Squilla cauda subulata, bifida: pedibus utrinque anticis binis cheliferis; quatuor subsequentibus natatoriis longissimis" is referred to *Cancer macrourus*, &c., *Linn. Syst. gen.* 239, *n.* 59, and to the "Krebsförmiger Wasser-Wurm. *Frisch. Ins. Germ.*, *part.* 7. *p.* 26. § 18. *Tab.* 18. *fig.* 1." The full description is repeated in his larger work almost verbatim. "459. Squilla cauda subulata integra: pedibus utrinque anticis binis cheliferis: quatuor subsequentibus natatoriis longioribus" is referred to *Cancer macrourus*, &c., *Linn. Syst. gen.*, 239, n. 56?

and to "Pulex marinus, *Klein. Pisc. Miss.* 5. *p.* 9. *Tab.* 4. *fig. A. B. C.*," with the concluding remark, "Habitat in mari Septemtrionali & stagnis aquæ subsalsæ. Color cinerascens. Magnitudine et forma convenit cum præcedenti." Number 991, the corresponding notice in his larger work, has, as will be seen, a very different concluding observation.

Of 457 a figure is given on Tab. V. The full description is as follows:—"*Corpus* oblongum teres, compressiusculum, dorso curvato, carinato. *Caput* oblongum, obtusum. *Antennæ* 4 (b. c.) prælongæ, pediformes, antico pari maximo, secundo piloso. *Oculi* duo minimi, in lateribus capitis, non cylindracei ut in Cancris, Astacisque. *Pedes* quatuordecim seu septem utrinque. Horum *primum par* tenerrimum, capiti insidens, ungulatum (d). *Secundum par* (e) omnium robustissimum cheliferum. *Chela* monodactyla, compressa, ovata, margine interiore denticulato. *Digitus* incurvatus, validus, deorsum versus carpum mobilis, subacutus, edentulus. *Tertium* et *Quartum Paria* (f. g.) vesiculas oviformes a Cl. *Bastero* dicta, sunt pedes natatorii, ovatæ formæ, omnium minimi: inter hosce pedes gravidæ. *Ova* gerunt: *Reliqua tria pedum paria* (h. i. k.) sunt subulata, longa, tenera, ungulata, ultimo pari longissimo. Hisce obvia arripit, ex illis dependet, et corpus quaquaversum movet. *Caudam* nullam detegere potui, licet ea a Cl. *Bastero* subulata depingatur. *Natans* dorso incumbit, capite præeunte. Maxima in copia ad littora Ziricæensia inter corallinas. *Color* subrubescens. Magnitudo dimidio minor quam in icone."

457.

Fig. 9.

1762. Strøm, Hans, born 1726, died 1797 (Hagen).

Physiske og Oeconomiske Beskrivelse over Fogderiet Søndmør, I. Deel, 1762.

He records a *Pulex cancriformis* or *Cancer macrourus rufescens*, which is found under stones on the beach or in the stomachs of fish. Further, he gives in plate i. figs. 12–13, a very recognisable drawing of *Hyperia medusarum* under the name of *Pulex cancriformis, antennis brevissimis, corpore latiore*, and states that it is found on large Medusæ (Boeck).

1763. Scopoli, Johann Anton, born 1723, died 1788 (Biographie Universelle).

Entomologia Carniolica exhibens Insecta Carnioliæ indigena et distributa in ordines, genera, species, varietates. Methodo Linnæana. Vindobonæ, MDCCLXIII.

Scopoli changes the Linnæan name Aptera into Pedestria for his seventh order. He defines *Cancer* thus: "Palpi (2) chelati. Oculi (2). Cauda inermis," and names the species numbered from 1123–1137, *Mænas*, *Depurator*, *Pagurus*, *Maia*, *Gammarus*, *Astacus*, *Squilla*, *Bernhardus*, *Diogenes*, *Istrianus*, *Nutrix*, *Cruentatus*, *Mantis*, *Locusta*, *Pulex*. The last two are described as follows:—

"1136. Cancer *Locusta*?

"Linn. Syst. Nat., p. 634.

"Faun. Svec. 2. 2042.

"*Diagn.* Corpus oblongum, gibbum, nitens, lateraliter compressum. Palpi antennis triplo longiores: articulis (20). Corpus sese incurvando & explicando saltans, *Poduræ* adinstar.

"Habitat abunde, circa littora Maris, sub saxis, prope *Tergestum*.

"Statura fere *Poduræ Aquaticæ*. Habitus *Cancri pulicis*. Corpus pellucens, ferrugineum, suturis (11), & denuo septem aliis utrinque ad bases femorum. Antennæ attenuatæ, articulis

sex. Oculi fusci, minime petiolati. Pedes utrinque sex, hinc simul duodecim, quorum 1, 2, 3, 6 (a cauda antrorsum numerando) femora ovata, compressa gerunt. Tibiæ vero primi paris pariter ovatæ, compressæ, & margine denticulatæ. Par ultimum capiti proximum, seu brachia, manu falcata unguiformi, unico dente in medio armata. Cauda adscendens, conica, linea brevior, subjectas habet setas duas ad basin usque bifidas. Hæc *Pulura Maritima* R. P. Poda, Mus. Græc., p. 121.

"1137. Cancer *Pulex*.

" Linn. Syst. Nat., p. 633.

" Faun. Svec. 2. 2041.

" Frisch. Ins. 7. Tab. 18. fig. 1.

" *Diagn.* Facies prioris, sed duplo minor, & albidus. Antennæ palpis longiores, sed non crassiores. Pedes pilosi. Maculæ croceæ laterales.

" Habitat sub *Hypnis*, & saxis, ad scaturigines fontium.

" Hic certe idem, qui a Frischio pictus, sed semper habitans in aquis dulcibus, non vero circa Mare, hinc dubito cum priore a Linnæo confundi, cum *Cancer Locusta* ab eo aliter describatur quam a nobis. Hic, quando exsiccatus, fulvus redditur, natat in latere, rarius in dorso; os fulvum gerit, nec corpus postice acuminatum. Interim certum adeo nobis cum priore a *Cancris* aliis diversum esse, ut novum Genus non immerito constitueret."

The "*Cancer Locusta?*" Pallas considers to be his *Oniscus Gammarellus*, since known as *Orchestia gammarellus*. The "*Cancer Pulex*" is in all probability the *Gammarus pulex*, auctorum.

"1140. Oniscus *Bicaudatus*," with "cauda duplex: utraque biseta," which "habitat copiosus Tergesti ad litus maris, inter saxa cursitans," is said by Franz Leydig to be the same as *Ligia italica*, Fabr.

Yeats, Institutions of Entomology, 1773, says that Scopoli and Geoffroy call the shorter antennæ the palpi in the *Cancri macrouri*. It may therefore be noticed that Scopoli, in describing "Cancer *Locusta?*" says, "Palpi antennis triplo longiores: articulis (20)," meaning, apparently, that the lower antennæ are three times as long as the upper.

1764. Brünnich, Martin Thrane, born 1737, died 1827 (Hagen).

M. Th. Brünnichii Entomologia, sistens Insectorum Tabulas Systematicas, cum Introductione et Iconibus. *HAFNIÆ*, CIↃIↃCCLXIV. Insectlære, indeholdende Insecternes Systematiske Tavler, samt Indledning og Figurer. Kiøbnhavn, 1764.

After describing the different parts of an "insect," and giving a list of the different writers on Entomology, Brünnich unfolds his own classification under the title "Tabulæ Insectorum perfectorum." There are two principal groups:—

"A. Capite a thorace distincto," containing,—"I. Hexapoda;" "II. Polypoda." Of these the *Polypoda* include three subdivisions:—"Pedibus segmentis corporis utrinque paucioribus; XIV. et plures; Corpore ovali;

"(*a*) Antennis duabus, ... } Oniscus."
"(*b*) Antennis quatuor, ... }

In the second subdivision *Scolopendra* is placed, and *Julus* in the third.

"B. Capite cum thorace unito," containing two sections, "I. Pedibus natatoriis omnibus," &c., for Monoculus; "II. Pedibus ambulatoriis," for Acarus, Pycnogonum, Phalangium, Aranea, Scorpio, Cancer. Of these the first four are Pedibus Octo, the other two Pedibus "Decem, anticis cheliferis; Cauda elongata, articulata." Cancer is defined "Oculis II, pedunculatis, distantibus; Cauda inermi;" with various (presumably specific) divisions,

grouped under the designations *Brachyurus* and *Macrourus*. The second section of the *Macrouri* is defined "Testa thoracem non tegente, brevissima: Manibus adactylis:" and may perhaps include the Amphipoda, notwithstanding the pedunculate eyes in the definition of CANCER.

In the preceding group, number 2 is the interesting new genus, which was soon after confounded with the Amphipod *Cyamus*. It is thus defined: "Oculis IV. Verticalibus; Corpore inciso tuberculato; Ore tubuloso producto: PYCNOGONUM (Fig. 7)." In the German rendering on the opposite page it is called "Strandspindel (Fig. 7)." The reference should obviously have been to Fig. 4.

In the "Explicatio tabulæ æneæ" the following account is given:—"Fig. IV. Novum genus, a R. D. Ström inter *phalangia* relatum, *Söndm. Tom. 1. p.* 209. *t.* 1 *f.* 17. Exemplar hujus insecti, quod munificentia R. Autoris possideo, ita describo; Caput cum thorace unitum, tubo *b.* excavato cylindrico, antice angustiore, postice in thoracem recepto, prominens; Oculi IV. dorsales *a.* in gibbositate thoracis positi; *c.* Antennæ 2. tubo breviores moniliformes, subtus in segmento thoracis, cui oculi insident, radicatæ; segmenta corporis, excepto tubo, IV. cum tuberculo e medio singuli segmenti prominulo. Pedes VIII. singuli ex articulis VII. brevissimis compositi, ungue valido terminati. Ex descriptione patet insectum hoc a generibus antea notis omnino differre, ideoque novum genus, quod e crebris articulationibus *Pycnogonum* dico, constituit."

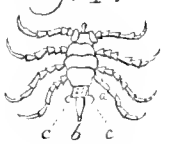


Fig 10.

Brünnich's Fig. 4 is here reproduced.

1764. GRONOV, LORENZ THEODOR.

Zoophylacii Gronoviani Fasciculus secundus exhibens enumerationem Insectorum quæ in Museo suo adservat, examini subjecit, systematice disposuit atque descripsit Laur. Theod. Gronovius. Additis rarissimorum Insectorum iconismis. Lugduni Batavorum, MDCCLXIV.

Among the Insecta Aptera he gives on p. 227 the following:—"ASTACUS, *Corpus* subcyliudricum, oblongum, articulatum, deorsum inflexum. *Thoraæ* trunco multo brevior. *Antennæ* binæ, vel sex subulatæ, articulatæ, tenuissimæ. *Cauda* foliacea, horizontaliter expansilis. *Oculi* duo, pedunculati, in fronte siti. *Pedes* utrinque novem vel decem. *Posteriora quatuor quinquere paria* curta natatoria. *Anteriora* longissima, quorum nonnulla plerumque chelifera."

Under this genus several Podophthalma are included, till on p. 232 he gives the following:—

"989. ASTACUS muticus; pede utrinque antico subulato, edentulo, longissimo, crassissimo.

"Astacus (crassipes) cauda intlexa, pedibus secundi paris tenuibus muticis. *Pallas in litteris.*

"Inter medium animal inter Astacum descriptum N. 985, et subsequens genus Squillæ. Habitat in aquis substagnantibus prope Lugdunum Batavorum. *Thoraæ* compressus, lævis, brevis, latiusculus, postice truncatus ore subtus prominulo. *Antennæ* quatuor, quarum utrinque lateralis seu exterior corpore parum brevior, attenuata, articulo ultimo in setam abiente longissimo hispido: interius par brevissimum setaceo-articulatum. *Truncus* elongatus, compressus, incurvus, segmentorum decem, quæ utrinque pone pedes (primo pari excepto) in triquetrum acumen abeunt. *Cauda* angusta, inflexa, expansilis, ejusdem structuræ, qua gaudent Astaci sub N. 985–988. descripti. *Pedes* in universum novem? *Prius par* toto corpore longius omniumque pedum maximum, et validissimum, corpori parallelum, antrorum [antrorsum] protensum, crassum, corpori utrinque sub thorace adnexum: hujus paris *arti-*

culus primus et secundus rotundi et inermes, thorace jam majores; *Articulus tertius* oblongus, utrinque compressus, margine inferiore versus articulum quartum *cuspide* valida aucto. *Articulus quartus* teres, rectus, oblongus, tertio parum brevior. *Quintus* subulatus, acutissimus, quarto dimidio brevior. *Reliqui pedes* brevissimi, exilitate aciem oculorum fugientes. *Tria posteriora paria* deorsum et sursum versa. *Color* totius ex cinereo albidus. *Longitudo* tota, extensis etiam prioribus pedibus, est quinque linearum." From this he passes at once to the genus *Squilla*, as follows:—

"Squilla, *Corpus* teres, compressum, incurvatum. *Thorax* brevissimus. *Oculi* in lateribus duo, non pedunculati. *Antennæ* quatuor, subulatæ. *Pedes* longitudine inæquales utrinque septem, anticis paribus cheliferis.

"990. Squilla cauda subulata, bifida: pede utrinque antico chelifero; tribusque utrinque ultimis natatoriis.

"Cancer macrourus articularis, manibus adactylis, pedibus patentibus, cauda cylindrica bifida. *Linn. Syst. Nat. Ed.* 10. *gen.* 239. *n* 59. *Rosel. Ins. tom. tab.* 62.

"Cancer macrourus rubescens, thorace articulato. *Ins. Paris, vol.* 2. *p.* 667. *n.* 2. *tab.* 21. *fig.* 6.

"Krebs-formigen Wasser-wurm. *Frisch. Ins. part.* 7. *p.* 26. §. 28. *tab.* 18. *fig.* 1.

"Pulex marinus. *Baster, Opusc. subsec. tom.* 2. *lib.* 1. *p.* 31. *tab.* 3. *fig.* 8.

"*Corpus* teres, oblongum, latius quam in congenere a me descripta in *Actis Helveticis vol.* 4. *p.* 39. et a Cl. Bastero in *Opusc. subsec. tom.* 1. *lib.* 1. *tab.* 4. fig. 2. Dorsum curvatum, rotundatum. *Caput* breve, obtusum. *Oculi* in lateribus, atri, minimi, non pedunculati. *Antennæ* quatuor incurvatæ. *Incisuræ* duodecim æquales, lævissimæ, splendidæ. *Pedum* septem paria, quorum *primum par* articulo secundo tertioque trunci subnexum, breve, cheliferum, æquale, monodactylum: *Tria* subsequentia paria omnium longissima, subulata, subæqualia, admodum teretia, articulis quinto, sexto, septimo et octavo trunci subnexa. *Reliqui pedes* antrorsum flexi teretes, articulis ultimis pilosis subulatis. *Cauda* lævis, subulata, bifida, haud longa. Habitat in stagnis aquæ dulcis atque salsæ. Dorso incumbens æque natat ac prone.

"991. Squilla cauda subulata integra: pedibus utrinque anticis binis cheliferis; quatuor subsequentibus natatoriis reflexis.

"Cancer macrourus articularis, manibus adactylis, cauda attenuata, spinis bifidis. *Linn. Syst. Nat. Ed.* 10. *gen.* 239. *n.* 56?

"Pulex marinus. *Klein Pisc. Miss.* v. *p.* 9. tab. 4. *fig. A. B. C.*

"Habitat in Mari Septentrionali. Balænas vexans mordendo."

The Iconographia sive Tabularum Explicatio, for pl. xvii. fig. 7, repeats the short definition of *Astacus muticus*, No. 989, of which the figure, though only life-size, is easily recognisable as *Oniscus volutator*, Pallas. The elaborate description of the first pair of feet obviously refers to the lower antennæ, and this, no doubt, together with the epithet *crassipes*, quoted by mistake from Pallas, led Linnæus in 1767 to call the species *Cancer grossipes*. See Notes on Pallas, 1766, 1772. Possibly the description of the "lateral or exterior" antennæ may be derived from the second gnathopods. No. 990 cannot be determined from the inconsistent references or the indefinite description. The statement that "it lives in pools of fresh *and* salt water" would imply that *Gammarus pulex* and *Gammarus locusta* are both in question. The description of the eyes as "minimi" suits neither. Herbst unites it with "Cancer *gammarellus*, Pallas," probably because Pallas does so. See Note on Pallas, 1772. No. 991, by the references, should be a *Gammarus*. The concluding observation points to a *Cyamus*. It is difficult to fit either to the description.

1765. Strom, Hans.

Beskrivelse over Ti norske Insecter. Forste Prove. Skrifter som udi de Kiobenhavnske Selskab af Laerdoms og Videnskabers Elskere ere fremlagte og oplæste i Aarene, 1761, 1762, 1763, og 1764. Niende Deel. Kiobenhavn. Aar 1765. (Pl. VIII. figs. 1–5.)

On p. 588 he describes "Et Hummer-lignende Insect med runde haar paa Bag-foderne. Cancer macrourus articularis, manibus adactylis, femoribus posticis orbicularibus, spinis caudæ bifidis." One of its most remarkable peculiarities, he says, is that it can hop half an ell high from the ground (en halv Alen hoyt). He notices its likeness to the common *Marylue*, or so-called *Pulex cancriformis*, but for the latter he gives seven good distinguishing characteristics, showing that he clearly understands the difference between his own species, which is *Orchestia gammarellus*, and the *Gammarus locusta*, which Linnæus describes as *Cancer macrourus rufescens thorace articulato*, Fn. Sv., § 1253. Of this *Pulex cancriformis* he observes, "Linnæus gives a second species, but nevertheless gives both one and the same name, as may be seen Syst. Nat. pag. 633 and 634; and though he gives a fresh description of each separately in his Ølandska Resa pag. 42 and 260, still it seems to me that both descriptions refer to one and the same. At any rate neither of them suits the insect here described." He notices that his own *Pulex cancriformis, antennis brevissimis, corpore latiore*, from Sondmor, is a third species, distinct from the hopper and from the Linnean species.

1765. Baster, Job.

Opuscula. Tom. II. Liber 3.
Natuurkundige Uitspanningen, &c.

On p. 155 (139) Baster remarks, that there is a creature which is called "Walvis-Luis," whale-louse, very different from the other fish lice, and which seems to him also to be a different creature from that described and figured under this name by Friderich Martens. Yet Linnæus, he says, Syst. Nat., p. 636, deems it the same, placing it among the *Onisci*, among which Baster thinks it cannot stand, since they have fourteen feet, while this animal, which Gronovius calls *Polygonopus*, has only eight. According to Lütken, 1873, Baster here described, and on pl. xii., figured *Pycnogonum littorale*, supposing it to be Martens' whale-louse, and so misled Linnæus (see Note 1767); but Linnæus in 1767 and Pallas in 1766 must have misunderstood Baster's accurate statements. Baster further points out that in Houttyn's Natural History, I. Deels 3. Stuk, p. 457, there is mention made of a Walvis-Luis which is in reality a *Balanus*.

1766. Pallas, Peter Simon, born 1741, died 1811 (Biographie Universelle).

Miscellanea zoologica. Quibus novæ imprimis atque obscuræ animalium species describuntur *et observationibus iconibusque illustrantur*. Hagæ Comitum, M.DCC.LXVI. pp. 190–194. Tab. XIV.

On page 189 he notices that his *Acarus marinus* seu Polygonopus, the *Pycnogonum* of Brünnich, is very different from the *Pediculus ceti* of Martens, which, he says, should properly be reckoned with the *Onisci*. "Non intelligo cur cel. Basterus Linnæum reprehendat, *Pediculum Ceti* Martensianum Oniscis adnumerantem."

As *Oniscorum cancriformium* species, he enumerates and describes, "1. Oniscus Pulex, *compressus pedibus quatuor anticis cheliformibus*," with references to Linnæus, Frisch and Roesel; "2. Oniscus Locusta, *compressus chelis nullis; pedibus secundi paris mucridis*," with references to Linnæus, Scopoli, Ray, and Dodonæus, pempt. p. 476, and figure, Tab. XIV. fig. 15, this being the Amphipod since known as *Talitrus locusta*, Pallas; "3. Oniscus Gammarellus, *compressus pedibus secundi paris cheliformibus maximis.*," "apud auctores nusquam occurrit, meruitque ideo *Tab. XIV.* fig. 25. delineari," this being since known variously as *Orchestia littorea* or *Orchestia gammarellus*, the latter name having priority beyond all contradiction. The next species is thus introduced: "Adfinis est *Oniscis cancriformibus* singularis species, cui *Oniscí volutatoris* nomen dedi, quia in aquæ superficie singulari modo capite cum antennis prævio volutatur.

"4. Oniscus volutator, *subcompressus, antennis exterioribus maximis.* Astacus muticus, pede utrinque antico subulato, edentulo, longissimo Gronov. *Zoophylac. vol.* II. *p.* 232. *n.* 989. Oniscus bicaudatus Lin. *Faun. suec. edit.* 2. *n.* 2062. Pulex marinus cornutus Raj. hist. p. 43.

"*Celeber.* Gronovius ad hanc speciem nomen *meum* citare dignatus est. Aliquot nempe Oniscorum descriptiones & icones in litteris olim communicaveram. Erant inter hos, quem supra descripsi, *O. Locusta*, & hic nunc describendus *O. volutator*. Priorem vocaveram (non *Astacum* crassipedem, sed *Oniscum* (crassicipitem) *cauda inflexa, pedibus secundi paris tenuibus muticis*. Hanc phrasin, nescio quo fato, ad *O. Volutatorem*, cui nullo modo convenit, excitavit Vir celeberrimus. Monendum hoc fuit, ne incuriæ ipse accusarer a guaris.

"*Oniscum volutatorem* inveni olim in fossis maritimis, prope *Harvicum* Essexiæ. *Cel.* Gronovius in fossis stagnantibus prope Leydam legerat. *Tabulæ* nostræ *XIV. fig.* 20. a latere visum exprimit."

The descriptions of the above species are given more fully in the Spicilegia Zoologica, Fasc. ix. 1772.

1767. Linnæus.

Caroli a Linné Systema Naturæ. Tom. I. Pars II. Editio Duodecima Reformata. Holmiæ, 1767.

The definition of *Cancer* now runs "*Pedes* VIII. (10 s. 6 *raro*) insuper Manus 2 chelatæ. *Oculi* II, distantes, plerisque pedunculati; elongati, mobiles. *Palpi* II, cheliferi. *Cauda* articulata, inermis." The last division, with the same heading as in 1758–60, now contains twelve species. Among these, at pages 1055–1056, are the following Amphipods; No. 80, *Cancer grossipes*, thus defined, "C. macrourus articularis, manibus adactylis longitudine corporis. Gron. zooph. 989 Astacus muticus, pede antico subulato edentulo longissimo crassissimo," the specific name *grossipes*, evidently based on the confusion made by Gronovius between the antennæ and gnathopods, being bound to yield to the earlier and more appropriate *volutator* of Pallas, as explained in the notes on that writer, under the dates 1766, 1772; No. 81. *Cancer pulex*, said to occur both in salt and fresh water, and to judge by the synonyms including, in Boeck's opinion, *Gammarus pulex*, *Gammarus roeselii*, and *Gammarus locusta* of later authors; No. 82, *Cancer locusta*, probably including *Gammarus locusta* and *Orchestia gammarellus*, Linnæus's remark about the uropods, "Pediculi unius paris caudæ lateribus adstant, bidigitati," not being very intelligible or decisive; No. 83. *Cancer linearis*, which in Boeck's view is without doubt the same as *Caprella lobata*, Müller, notwithstanding the reference to Martens's *Caprella septentrionalis*; No. 84. *Cancer atomos* with "pedibus undecim" and a reference to Baster, and the observation "habitat in Europæ aquis fluctuantibus dulcibus, nudis oculis vix visibilis, præcedenti

affinis," which, together with No. 85, *Cancer filiformis*, Boeck considers to represent *Caprella lobata*. Mayer's opinion as to Nos. 83, 84, 85 is that the descriptions given by Linnæus are practically worthless, that the reference to Martens is useless, since his species also is quite indefinite, so that, though he inclines to take Baster's *mirum animalculum in corallinis* as equivalent to the modern *Caprella linearis*, he only retains the latter name with the addition of "Bate" as an authority, because the so-named species has been commonly employed as type of the genus.

At page 1059 is given the definition of "Oniscus. *Pedes* XIV. *Antennæ* setaceæ. *Corpus* ovale." On page 1060 the following Amphipods are referred to this genus :—

"Ceti. 6. O. ovalis ; segmentis distinctis, pedibus tertii quartique paris linearibus ovaticis. *Mus. Ad. Fn.* 1. *p.* 89. *Fn. svec.* 2056.

"*Habitat* in Balænis, *distinguendus a Phalangio Balænarum, simili.*

"2 caudatus. 8. O. semicylindricus, caudis duabus longitudine corporis, *Fn. svec.* 2062.

"*Habitat in* O. Norvegico."

Thus *Oniscus ceti* appears with the same definition as in the Fauna Suecica, 1761, with the slight change of *ovaticis* for *muticis*, probably by a misprint, but Lütken points out that the reference to Martens is now omitted, while his whale-louse is now made a synonym of *Phalangium balænarum* (Brünnich's *Pycnogonum*), introducing a confusion that was not for a long time to be thoroughly dispersed. The *Oniscus bicaudatus* had been identified by Pallas in the previous year, 1766, with the *Astacus muticus* of Gronovius, which Linnæus here calls *Cancer grossipes*, but the suggestion may have come too late to be available for the present edition of the Systema Naturæ.

1768. Adelung, Johann Christoph., born 1734, died about 1806 (Biographie Universelle).

Geschichte der Schiffahrten und Versuche welche zur Entdeckung des Nordöstlichen Weges nach Japan und China von verschiedenen Nationen unternommen worden. Zum Behufe der Erdbeschreibung und Naturgeschichte dieser Gegenden. Halle, 1768.

In a note to page 320, Adelung states that Fr. Martens made his journey to Spitzbergen "als Schiffsbarbier auf einem hamburgische Schiffe." The two first plates of Martens' work he does not consider worth reproducing, but all the rest of it, both figures and text, he gives in

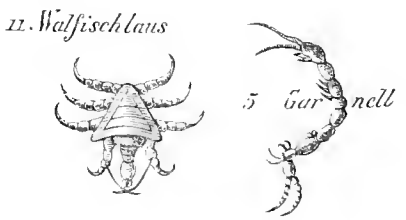


Fig. 11.

Fig. 12.

full, only polishing and modernising the language. To some of the figures also he seems to have thought it necessary to give a little extra finish. It has been already mentioned that he apportions Martens' fig. *i.* to Der Garnell, reproducing it as fig. 5 on Taf. xvii. in his own work, without any explanation of the inconsistency between the figure and the description. How highly Martens' book was valued may be inferred from Adelung's notice that "in the year 1685 a Dutch translation appeared at Amsterdam ; an English one is to be found in

the Account of several late Voyages and Discoveries to the South and North by Sir *John Narborough* [Narborough], Cap. *Tasman*, Cap. *John Wood* an Frederik Marten, London 1694 in 8., French one in the Recueil de Voyages au Nord Th. 2. S. 1."

1769. HOUTTUYN, F. (Publisher).

Natuurlyke Historie of uitvoerige Beschryving der Dieren, Planten en Mineralen, Volgens het Samenstel van der Heer *Linnæus*. Met naauwkeurige Afbeeldingen. Eerste Deels, dertiende Stuk. Vervolg en Besluit der Insekten. Te Amsterdam, By de Erven van *F. Houttuyn*, MDCCLXIX.

In chapter 82, p. 295, of this voluminous work, the anonymous author begins the description "van 't Geslagt der Krabben en Kreeften." On page 436, among "de Kreeften," is given the following description:—"LXXX. *Grossipes*, Dikpoot, Pl. CVI. *Fig.* 1. (80) Kreeftje, *gebeel in Leden verdeeld, met de Schaauren omgeringerd en zo lang als 't Lyf.* De Heer Pallas, thans Hoogleeraar te Petersburg, hadt aan den Heer Gronovius de Kenmerken toegezonden van een Insekt, 'twelk zyn Ed in het Water der Vaarten by Leiden ontdekt hadt, en thans omstandig als een middelsoort tuschen de Garnaalen en Zee-Vlooijen, voorgesteld wordt. Die van onze Afbeelding, Plaat CVI. Fig. 1, schynen van de beide de volgende Soorten aanmerkelig

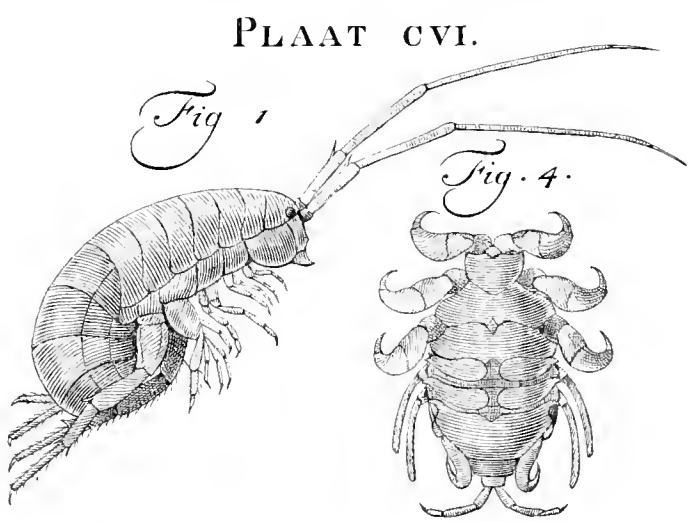


Fig. 13.

te verschillen, en, indien men de Hoorntjes op den Kop voor ongevingerde Schaaren neemen mogt, nader met de opgegevene Kenmerken overeen te komen; inzonderheid, dewyl de dikte der agterste Pooten gedagten Bynaam op dezelven toepasselykt maakt. Zodanige Springertjes komen hier, op natte zoute Gronden, zelfs in de Kelders der Huizen voor: zynde de Afbeelding in langte ongevaar drie of vier maal vergroot." A note says "(80) *Cancer macrourus* articularis, Manibus adactylis longitudine Corporis *Syst. Nat.* XII. Astacus muticus, Pede antico subulato, edentulo, longissimo, crassissimo, GRON. *Zooph.* 989." While therefore the reference is to *Cancer grossipes*, Linn., the figure is clearly one of the Orchestidæ, probably *Talitrus locusta*. Under these circumstances, to account for the name *grossipes*, recourse is had to the thickness of the hindmost feet, "de dikte der agterste Pooten."

The following names are then attached to species which the writer describes but does not figure, depending for his information on the authors, various and numerous, to whom he gives references:—81. "*Pulex*. Zee-Vloo." 82. "*Locusta*, Springer," and "Rivier-Vloo." 83. "*Linearis*, Smalle," with a reference to "MARTENS, Spitsberg. 56. T. P. f. 1." 84. "*Atomos*, Zeer kleine," with references to Linnæus and Baster. 85. "*Filiformis*, Zeer dunne," from Malacca, with a reference only to Godeheu de Riville, whose species from Ceylon the author considers to resemble this *filiformis*. 85. *Salinus*, and 87, *Stagnalis*, are not Amphipods.

Chapter 84, page 481, contains "*Beschryving van 't* Geslagt der Pissebedden; *het welke, behalve de gewoone* Land- en Water-*Pissebedden, ook veelen, die men gemeenlyk* Zee-Luizen *noemt, en de eigentlyke* Walvisch-Luizen bevat." On pp. 491–493 he gives an account of *Cyamus mysticeti*, Lütken, beginning as follows:—"*Ceti*. Groenlandse Walvisch-Luis. Pl. cvi. *Fig.* 4. 5. (6) Pisseb*ed*, *die ovaal is met duidelyke verdeelingen; de Pooten van het derde en vierde Paar egaal van breedte, smal en stomp.*

"De Insekten, op onze Plaat cvi. in Fig. 4 en 5, afgebeeld, zyn voor eigentlyke Walvischluizen uit Groenland gebragt, en komen overeen met de beschryving, welke Linnæus geeft van deeze Soort, zeggende, dat die het Lyf ovaal of eyrond heeft, bestaande uit zeven onderscheidelyke Ledjes, waar van de Kop het kleinste is: dat de Pooten van het eerste, tweede, vyfde, zesde en zevende Paar, dikke Schaaren hebben, die uitloopen in een beweeglyke scherpe Klaauw; doch, dat die van het derde en vierde Paar Draadagtig en stomp zyn. Het eerste Paar is onder het Lyf geplaatst. De Verdeelingen zyn meer van elkander afgezonderd, dan in de overige Soorten." Some observations upon earlier authors are then made. The description continues, "Die van onze Plaat zyn, in langte en breedte, ruim driemal zogroot als natuurlykt gemaakt, en geelagtig wit van Kleur, doch de smalle Pootjes zwart." "Wy hebben 'er *Fig.* 5, van de onderzyde, bygevoed; om een groote Blaas te vertoonen, die sommigen van deeze Insekten voor aan den Buik voeren, komende hier in met de Water-Pissebed van BAKER overeen. Mooglyk zullen zy, in dezelve, haare Eijertjes of jongen draagen. Dat die zwarte smalle Pootjes haar tot Riemen dienen, om eenigermaate te kunnen swemmen, is niet onwaarschynlyk. Zy zyn zeer duidelyk voorzien met Sprieten of Hoorntjes en hebben voor, op den Kop, twee kleine gladde Oogjes."

1769. SLABBER, MARTIN, born 1741, died 1835 (Bovallius).

Natuurkundige Verlustigingen, behelzende microscopise Waarneemingen van in- *en* uitlandse Water- en Land-Dieren. Door Martinus Slabber. Te Haarlem, 1769. (First title-page dated 1778.)

The "tiende Stukje," pp. 79–83, describes a Zee-Scherminkel (*Phtisica marina*), which P. L. S. Müller renders *Seestengel*. The figure shows it pretty evidently to be *Proto ventricosa* O. F. M. The author says "each foot is on the under side at its base covered with a little elongate leaf as can be seen at e [in the figure] and at all the seven feet." The legs and hands are all represented as filiform, the first pair shortest, the next four pairs equal to one another, the last two pairs much longer than those preceding.

The "elfde Stukje," pp. 92–96, describes what he calls een Zand-Pissebed (*Oniscus arenatius*), *Oniscus Arenarius* in the preliminary List of Names. It is strikingly figured, pl. xi. figs. 3, 4. It has been made the type of several successive genera, different only in name, *Haustorius*, Müller, *Lepidactylis*, Say, *Pterygocera*, Latreille, *Bellia*, Sp. Bate, *Sulcator*, Sp. Bate. See notes on P. L. S. Müller, 1775, Bovallius, 1878, and S. I. Smith, 1880.

It seems reasonable to accept the date 1769 for Slabber's book in preference to 1778, since the translation of it by P. L. S. Müller is dated 1775.

1770. Pallas, P. S.

Dierkundig mengelwerk. 4° m. Pl. Utrecht, 1770.

This, I suppose, is the Miscellanea zoologica, of 1766, in Dutch. It is mentioned by R. T. Maitland, 1875, who refers to it under the species *Orchestia littorea*, Leach, and *Talitrus saltator*, Edw.

1770. Ström, Hans.

Beskrivelse over Norske Insecter. Anden Prove, pl. ii. figs. 1–8. Skrifter som udi det Kiobenhavnske Selskab af Lærdoms og Videnskabers Elskere ere fremlagte og oplæste i Aarene 1765, 1766, 1767, 1768, og 1769. Tiende Deel. Kiobenhavn. Aar 1770.

On p. 5 he describes "En Marflue, eller liden Krabbe, med Kioldannet og Sav-lignende Ryg. Cancer macrourus articularis, dorso carinato serrato, spinis caudæ bifidis," and figures it Tab. ii. figs. 1–8. The mandibular palp in fig. 3 seems to show the outermost joint divided into three, a mistake perhaps owing to some folding of the palp accidentally in the course of dissection. Boeck identifies the creature described, no doubt correctly, with *Gammarus* (now *Amathilla*) *sabini*, Leach. The species appears to be the *Gammarus homari* of Fabricius, and the *Amathilla sabini* of Bate and Westwood, in which case its name will properly stand as *Amathilla homari* Fabr.

1772. Pallas, Peter Simon.

Spicilegia zoologica, quibus novæ imprimis et obscuræ animalium species iconibus, descriptionibus atque commentariis illustrantur cura P. S. Pallas. Fasciculus nonus. Berolini, MDCCLXXII. pp. 50–80, Tab. iii. iv. (To the German version by E. G. Baldinger, Mayer, Caprelliden, p. 199, assigns the date 1769, probably referring only to the commencement, not to the ninth fasciculus, of the work.)

He here says "*Cancris* proximum est Oniscorum genus, transitum indicantibus *Squillis*," and "*Oniscorum squilliformium* e phalange quatuor species mihi cognitæ sunt." Of these he proposes to leave out Roesel's already well-known species, and to describe the remaining three.

The first is a new species, peculiar to Siberia, as far as he knows, "abundat autem in Lena, fluvio ulterioris Sibiriæ, & omnibus quæ in illum colliguntur fluentis, præcipue Angara & Lacu Baikal e quo profluit Angara." He has learnt some facts about it from Steller, "in cujus schedis de hac specie (quam 'Squillam fluviatilem seu Phryganeum fluvii Angaræ' appellavit) quædam memoriæ prodita inveni." Steller, he says, states that "individua dari quædam mucronibus dorsalibus destituta, quæ alterius sexus esse putat, nisi diversæ potius speciei fuerint." E. Laxman, from whom Pallas received a specimen, called it "Cancrum baikalensem," but Pallas himself describes and figures it (Tab. III. Fig. 18) as *Onisens cancellus*. This Dybowsky in 1874 is content to retain under the name *Gammarus cancellus*, Pallas, adding a variety *Gerstfeldtii* of his own discovering. By Spence Bate, however, in 1862, the species was made the type of a new genus *Pallasea*, which must not be corrected into *Pallasia*, and thereby confounded with the Dipterous genus *Pallasia* instituted by Robineau-Desvoidy in 1830.

Pallas next discusses the synonymy of "Oniscus Locusta," and thus decides,—"Præter Rajum itaque, qui (*hist. ins. p.* 44). Pulicem fluviatilem, a marino distinguit, et forte Dodonæum (*pemptad. p.* 476. *icon.*) neminem ad Locustam citari posse arbitror; quam enim Scopoli (*Entom. carniol. p.* 411). Locustæ dedit descriptionem, sequenti potius speciei nostræ, *Onisco* nempe *Gammarello* convenit." In the description of *Oniscus locusta*, Tab. iv. fig. 7, he says "*Pedes* septem parium (non *octo*, ut in *Miscellaneis* fugitivo calamo scripseram); *priores* antrorsum versi, sex postici retrorsum. *Par primum* crassius reliquis; *secundarii* pedes exiles, velut atrophia absumti; mutici." This is now accepted as *Talitrus locusta*, Pallas.

For the next species he refers, as above, to Scopoli's "*Cancer Locusta*," and also to his friend Gronov's *Fasc.* II. *p.* 232. *num.* 990, where, however, he thinks that all the synonymy, except perhaps the reference to Baster, belongs to *Pulex*. That Boeck is right in assigning the name *Orchestia gammarellus*, Pallas, precedence over *Orchestia littorea*, Montagu, is clear from the following "Descriptio Onisci Gammarelli, Tab. IV. Fig. 8. *Magnitudo* Onisci Pulicis. Forma quasi media inter Pulicem & O. Locustam. Priore scil. brevior, posteriore gracilior est; capitis tamen parvitate Pulici similior. *Antennæ exteriores* majores quam in utrolibet, *secundus* harum *articulus* præsertim notabilis, majusculus, linearis, quadrangularis, superiore latere scaber. *Antennulæ* intermediæ minimæ, ut in O. Locusta; quum contra in O. Pulice exteriores ferme æquent. *Pedes* septem parium; *primi* paris parvuli, exiles; *secundarii* chela magna, ventricosa, adactyla terminati; quum in O. Pulice quatuor priores sint cheliferi, et subæquales. *Pedes quarti* paris (non quinti, ut habent *Miscellanea*) omnium brevissimi, et cum sensim longioribus sex posticis retrorsum versi; vel saltem ambigui quarti; postici vero, ut in affinibus plane reclinati. Et hi quoque *femoribus* planis, foliaceis, ovatis singulares, qualia in O. *Cancello* supra observavimus. *Styli* caudales bifurci duorum parium, et *uncus* duplex terminales, pedunculique subcaudales, setacei, ut in affinibus. In spiritu vini albet hæc species, viva subcinerascens; at siccata rubescit, ut coctæ *Crangones*. *Magnitudinem* exprimit icon."

Boeck in his chronological review, p. 35, assigns the *locusta* and *gammarellus* of Pallas respectively to the female and male of *Orchestia littorea*, while in the body of his work, pp. 101, 104, he takes "*Oniscus gammarellus*, Pallas, (Cancer gammarus littoreus, Montagu)," as type of the genus *Orchestia*, Leach, but *Talitrus* (*Oniscus*) *locusta*, Pallas, as type of the genus *Talitrus*, Latreille. Meinert considers that the figures and descriptions by Pallas do not suffice to separate his *Oniscus gammarellus* from his *Oniscus locusta*, and that therefore Montagu's *Cancer* (*Gammarus*) *littoreus* should determine the specific name of *Orchestia littorea*, but surely the "chela magna, ventricosa" in *gammarellus* sufficiently proves that that species is an *Orchestia*, while Montagu himself identifies the *locusta* of Pallas with his own *saltator*, which is a *Talitrus*. It may be noted also that for "Cancer *gammarellus*, Pallas," Herbst gives Baster's figure, which pretty clearly refers to the *Orchestia* in question.

On *Oniscus volutator*, after repeating some of the observations already made in the *Miscellanea*, Pallas says, "Distinete satis Oniscum nostrum indigitat *Rajus* (*hist. ins. p.* 43.) Pulicis marini cornuti nomine. Vix etiam dubium est Oniscum bicaudatum Linnæi (*Faun. Su. ed.* II. *n.* 2062. *Syst. Ed. XII. p.* 1060 *sp.* 8.) hunc ipsum nostrum esse, ubi Linnæus, e siccato forsitan specimine, antennas exteriores pro caudis nominavit. *Amicus* Gronovius omnium novissime, ante edita *Miscellanea* mea, hanc speciem descripsit & Astacum vocavit, *Zoophylacii Fasc. II. p.* 232. *num.* 989, ubi quoque iconem a me communicatam, in *tab.* 17. *fig.* 7. adjecit. Ex Gronovio iterum adoptavit speciem nostram Linnæus & vocavit *Cancrum grossipedem* (*Syst. nat. XII. p.* 1055. *sp.* 80." It is obvious therefore that the name *volutator* given by Pallas should take precedence, unless Linnæus alone of all men had a right to change suitable names already given for unsuitable ones of his own devising.

On *Oniscus ceti*, Pallas says, p. 76, "*Oniscum Ceti* primus, quantum video, et accurate quidem

descripsit Frid. Martens, (*itin. Spitzberg. ed. germ. p.* 85. *n.* 4.) adjecta etiam rudiori icone (*tab.* 8. *fig. d.*). Martensii locum Linnæus olim (*System. ed.* X. *p.* 636. *sp.* 6.) ad *Oniscum Ceti*, quem graphice exprimit, recte citaverat. Verum eundem in editione novissima nessio quo permotus argumento, perperam de *Acaro polygonopo* nostro, quem inter Phalangia collocat (*System. Ed. XII. p.* 1028. *p.* 6. *sp.* 6.), perperam interpretatus est; *Oniscum Ceti* autem absque synonymo ullo recensuit (pag. 1060. *sp.* 6.). Distinctissime tamen speciem delineat etiam Seba *thes. Vol. I. tab.* 90 fig. 5. quæ icones Linnæo ignotæ esse haud potuere." Of the young, he says, "Apprime miratus sum, quod eorundem forma gracilis, scolopendriformis exacte esset similis *speciei sequentis*, cujus minima, vulgaribus Poduris vix longiora specimina ita referunt, ut, nisi intra matris diversæ alvum pæne reperti, pro iisdem omnino haberentur." He gives a description of *Oniscus ceti*, Tab. iv. fig. 14, A. B. C., probably, in Lütken's opinion, referring to the species which Lütken calls *Cyamus mysticeti*.

This is followed by a discussion of *Oniscus scolopendroides*, in which he says, "Primam, ni fallor, hujus Insecti distinctam notitiam debemus *Oberv.* Bastero. In honorem tamen Optimi Stelleri monendum est, accuratam descriptionem hujus insectuli marini, ad Kamtschatkam ab illo observati, in schedis ejus exstare.

"*Oniscus scolopendroides* qualem Basterus describit, quem Linnæus (*System. ed. XII.* p. 1056. *sp.* 84.) satis paradoxo nomine et genere *Cancrum atomon* vocat, forte ab Ejusdem *Cancro lineari* atque *filiformi*, vel horum saltem priore, nonnisi ætate differt. Certe quod F. Martens (*itin. Spitzb., p.* 85. *n.* 3. *Tab. P. fig.* 1.), nomine Squillæ parvæ describit & delineat insectum, vix aliud quam *Oniscus scolopendroides* noster videtur fuisse. Et adumbrationes, quas Linnæus dedit de Cancris *lineari* & *filiformi* suis, ambo in nostram speciem sat bene quadrant; ut summa saltem horum trium insectorum debeat esse affinitas.

"Quod vero hæc insecta ad Cancros malo omine reduxerit Linnæus, neque naturale eorum genus perspexerit, eo magis miror; quia *Oniscum Ceti* ad legitimum genus jamdudum judiciose retulit. Adeoque structuram prædictarum specierum cum *Oniseo Ceti* contulisse non videtur; Nemo enim, qui oculis utitur, non videt eandem esse hujus *Onisci scolopendroidis* affiniumque compositionem, & structuram quoad omnes partes, truncum, antennas, pedes perfectos, & pedunculos. Imo tanta, ut jam monui horum est similitudo, ut minuta ab *Oniseo Ceti* edita proles, quæ gracilis adhuc et macilenta est, vix ab *Oniseo scolopendroide* discerni queat, ...

"*Oniseo Ceti* etiam in eo convenit hæc species, quod *ovula* feminæ sub medio corpore membranulis inclusa circum ferant; inter æstate adlatos, copiosissimas semper observavi feminas hoc more gravidas; quæ res a Diligentiss. Bastero adnotata haud fuit; probatque corpuscula pedum mediorum vicaria minime esse ovula, quamvis sub ipsis illis globus ovulorum in fœtificantibus hæreat. Figura Martensii supra citata id boni habet, quod exprimat situm, quo *Oniscus scolopendroides* in aqua & spiritu vini convulsus uori constanter observatur."

The description which follows of *Oniscus scolopendroides*, and the figures, Tab. iv. fig. 15, A, b, c, do not suffice to establish its specific name. Lütken considers that Pallas presses rather too far the resemblance between the young of *Caprella* and those of *Cyamus*, though giving him due credit for having called attention to it, as well as for being the first to remark on the incubatory pouch of *Cyamus*, and on the difference between the young and adult forms, besides correcting Linnæus' reference of Martens' *Cyamus* to *Acarus polygonopus* (*Pycnogonum*).

1772. Olafsen, Eggert, born 1726, died 1768 (Biographie Universelle).

Olafsen, Eggert, og Povelsen, Bjarne. Reise gjennem Island. Tom. i og ii. Sorø, 1772.

Olafsens und Povelsens Reise durch Island, veranstaltet von der königlichen Societät der Wissenschaften in Kopenhagen und beschrieben von bemeldtem Eggert Olafsen. Aus dem Dänischen übersetzt. Kopenhagen und Leipzig, 1774.

§ 687, Von den Insecten, under VI., the Aptera, E. Caneri, &c., gives "d) Marflo ist Cancer pulex Linnaei Fn. Sv. 1253. Sie verdirbt das Netz, welches nach den Forellen und Rödmagen nahe an dem Ufer gestellt wird, und frisst die darinnen gefangene Fische. Macht man die untersten Maschen aus Pferdehaaren, soll sie selbige nicht zernagen." This relates to the West-fiord. In § 746, Marfloen are also recorded from North Iceland. The destruction of nets by some species designated as *Cancer pulex* is confirmed by Ödmann's observations at this period, but that it attacks live fish he denies; the fish, on the contrary, he says, as any cook can tell you, devour the *Cancer pulex*.

1773. Yeats, Thomas Pattinson (born ?), died 1782 (Maunders).

Institutions of Entomology being a translation of Linnæus's Ordines et Genera Insectorum; or Systematic Arrangement of Insects. Collated with the different systems of Geoffroy, Schaeffer, and Scopoli; together with observations of the translator. London, MDCCLXXIII.

He says that Schaeffer in his Elementa Entomologiæ, Ratisbon, 1766, has followed Geoffroy. His own work opens with a glossary of the terms used in entomology. In his account of Cancer, Genus X. in Order VII., the Aptera of Linnæus, Syst. Nat., p. 1038, he gives as the second family the Macrouri or long-tailed crabs, with five subdivisions, of which the fifth may possibly refer to the Amphipoda. It is obscurely defined as "Those in which the shell of the thorax is shorter than that part, which it does not cover entirely."

1774. Phipps, Constantine John (afterwards Lord Mulgrave, born 1734, died 1794 (Biographie Universelle).

A Voyage towards the North Pole, undertaken by his Majesty's Command, 1773. London, MDCCLXXIV.

In the Appendix, under the heading Insecta, pp. 189–193, pl. xii., Phipps gives two species which are not Amphipods; "Cancer *Squilla*, Linn. Syst. Nat., 1051, 66. The Prawn;" "Cancer *boreas*," with a description and figure; and three Amphipods thus described:—

"Cancer *Ampulla*, macrourus, articularis, corpore ovali, pedibus quatuordecim simplicibus, laminis femorum postici paris ovato-subrotundis. Tab. xii. Fig. 3. This singular animal was also taken out of the stomach of the same seal in which the two former were found. Its place in the *Systema Naturæ* is next to *Cancer Pulex*. Description. Insectum ex ovali-oblongum, glabrum, punctulatum, articulis quatuordecim compositum, quorum primus capitis est, septem thoracem mentiuntur, et sex caudam tegunt. *Capitis* clypeus antice inter antennas in processum conicum, acutum descendit. *Antennæ* quatuor, subulatæ, articulatæ, simplices, corpore decuplo breviores. *Pedes* quatuordecim, simplices, unguiculati; *femora*

postremi paris postice acuta, lamina dimidiato-subrotunda, integra, magna, quatuor lineas longa. *Cauda* foliata, foliolo unico brevi bifido: *Laciniæ* lanceolatæ, acutæ. *Neusteri* duodecim, duplicati, subulati, pilis longis ciliati, posteriores retrorsum porrecti. *Obs.* Specimina magnitudine variant, uncialia et biuncialia erant." This is now the type of the genus *Stegocephalus*, Kroyer, 1842.

"Cancer *nugax*, macrourus, articularis, pedibus quatuordecim simplicibus, laminis femorum sex posteriorum dilatatis subrotundo-cordatis. Tab. xii. Fig. 2. This animal, which has not before been described, should be inserted in the *Systema Naturæ* near *Cancer Pulex;* it was taken in the trawl near Moffen Island. Description. Insectum oblongum, compressum, dorso rotundatum, glabrum, sesquiuneiale, articulis quatuordecim compositum, quorum primus capitis est, septem thoracem mentiuntur, et sex caudam efficiunt. *Capitis clypeus* sinu obtuso antice pro antennis emarginatus. *Antennæ* quatuor, subulatæ, multiarticulatæ; *superiores* corpore sextuplo breviores, bifidæ; articulo baseos communi, magno; *Ramulus* interior exteriori duplo brevior. *Inferiores* simplices, superioribus duplo longiores. *Pedes* quatuordecim, simplices, unguiculati, unguibus parum incurvis. *Femora* sex posteriora postice aucta. *Lamina* foliacea, subrotundo-cordata, dimidiata, margine integra, magna, (tres lineas longa). *Cauda* apice foliata. *Foliolis* duobus, oblongis, obtusis, parvis. *Neusteri* duodecim, duplicati, lineari-lanceolati, posteriores retrorsum porrecti, ut facile pro appendicibus caudæ sumantur." Kroyer, Nat. Tidsskr. 2 R. i. p. 578 (1844), mixes up *Cancer ampulla*, Phipps, and "*Cancer nugax*, Phipps. ?!" with his own *Anonyx lagena* and *Anonyx appendiculosus* under the title *Anonyx ampulla*, Phipps. *Cancer ampulla*, as already stated, belongs to *Stegocephalus*. *Cancer nugax*, Phipps, is almost beyond doubt the same as *Anonyx lagena*, Kroyer, and accordingly E. J. Miers, with good reason, gives precedence to the specific name *nugax*.

Of his third Amphipod species, Phipps only says: "Cancer *Pulex*, *Linn. Syst. Nat.* p. 1055. 81. Taken up in the trawl along with the former."

1774. Steller, Georg Wilhelm, born 1709, died 1746.

Beschreibung von dem Lande Kamtschatka, dessen Einwohnern, deren Sitten, Nahmen, Lebensart und Verschiedenen Gewohnheiten herausgegeben von J. B. S. mit vielen Kupfern. Frankfurt und Leipzig, 1774.

Mayer, Caprelliden, p. 4, remarks, "Pallas, dessen Spicilegia zoologica ich nur aus der Uebersetzung von Baldinger kenne, fasst 1767 die ihm bekannter Amphipoden unter dem Namen *Oniscus* zusammen und beschreibt als *O. Scolopendroides* (Röhrpolypenlaus oder kleinste Afterassel) einen halbdurchsigtigen, gelben, nach der Abbildung zur heutigen Gattung *Caprella* gehörigen Krebs, den Steller schon als *Pediculus marinus* in Kamtschatka beobachtet haben solle." He appends a note to explain that he has not himself had an opportunity of examining Steller's work on Kamtschatka. The only passage in it at all applicable, that I can find, is on page 199, where, in a note, Steller says, "An der See soll sich ein Insect befinden, wie eine Laus, welches durch die Poros der Haut in das Fleisch und immer weiter kriechet." This causes horrible pain, and can only be got rid of by cutting it out. Steller had not himself seen it, but promises to look out for a chance of doing so. His account of it so far is little suitable to *Caprella*. In the note on Pallas, 1772, it will be seen that he ascribes to Steller the credit of having accurately described *Oniscus scolopendroides* observed by him in Kamtschatka, but it is the description "hujus insectuli marini," not of a pediculus marinus, that he has left in his papers. See also note on Tilesius, 1815.

1774. Ginnani, Co. Francesco.

Storia civile e naturale della Pinetta Ractenati, 1774.

G. D. Nardo says that this author mentions, on p. 437, "il Pulce d'aequa dolce, *Gammarus*." I have not been able to meet with his work.

1775. Hammer, Christopher.

Forsog til en Norsk Natur-Historie, 1. Deel. Kiobenhavn, 1775.

In the Fauna Norvegica, with which the work begins, under "Krabbe, Cancer," there are given:—

"735 Marflue. *Cancer Pulex* 2041. Findes under Strand-stenene.

"736 Krebsformige Loppe, Krebsloppe, Marflue. *Pulex Cancriformis*. Hos Hr Strom i. Sondmors Beskrivelse er den aftegnet. Tab. I. fig. 12 og 13. Olafsen, p. 609 d.

"738 Kioldannet Marflue. *Cancer macrourus articularis*. Har sanglignende Ryg, er brun- og hvidplettet; findes i Soen ved Strandbredden. Strom i Act, Hafn. 10 Tom. pag. 5, Tab. 2.

"739 Hummerlignende Insekt. *Cancer macrourus articularis*. Strom i 9de Deel af Kiobenhavnske Selskab-Skr. p. 588. Derom kan og eftersees Linnæi *Cancer Stagnalis*, 2043. S. N. I T. 12 Ed. p. 1056. N. 87."

On page 17, to his mention of "Sletbag, Gronlandsk Hval. *Balæna mysticetus*;" he appends a note: "Den nærer sig af smaa Orme, som af Hr Egede kaldes Hvalfiskaas."

The above Amphipoda are sufficiently explained by the references to Strom and Egede.

1775. Forskål, Pehr, born 1736, died 1763 (Encycl. Brit., 9th Ed.).

Descriptiones Animalium, Avium, Amphibiorum, Piscium, Insectorum, Vermium; quæ in itinere orientali observavit Petrus Forskål. Prof. Haun. Post mortem auctoris ed. Carsten Neibuhr. Adjuncta est materia medica Kahirina atque tabula maris rubri geographica. Hauniæ, 1775.

Among the Insecta, in the genus Cancer, division B. Macrouri, he describes, pages 95–96, what is now known as *Phronima sedentaria*, as follows:—"59. Cancer sedentarius; *macrourus; articularis; manibus adactylis.*

"Descr. Color vitreus, flavescens. *Caput* fere conicum, perpendiculare, ante paululum planatum, juxta verticem emarginatum. Ori utrinque sphærula oculiformis adjacet; supra quamque harum, cylinder perpendicularis erigitur, *oculum* referens; sint-ne ergo huic animali duo oculorum paria, affirmare non sustineo. *Antennæ* setaceæ longitudine cylindrorum, lateri eorum anteriori affixæ. *Thoraæ* ovato-lanceolatus, septem-articulatus. *Cauda* lineari-attenuata, compressa, antice articulis 3. rotundatis, pone truncatis, utrinque unispinosis. Articuli duo angustiores apicem caudæ constituunt, cui insistunt spinæ sex, vel setæ lineares, apice bifidæ, acutæ. *Pedes* utrinque decem: paria enim septem, thoracis septem articulis adhærent; omnia adactyla, præter *quinti* ordinis par, cæteris multo crassius, longius, *femoribus* compressis, apice uni-spinosis, carpis clavatis, chelis obovatis, ventricosis; digitis adeo curvatis, forficatis, introrsum dente instructis. Priora 4. paria *plantis* gaudent setaceis, curvatis & longitudine superantibus plantas *posteriorum* pedum thoracicorum, quorum paria retrorsum majora majoraque: & *membrana* subtus acuta utrinque triplici, ovata, natatoria. Articulis Caudæ tribus, totidem pedum paria, versus apicem caudæ gradatim minora affiguntur, brevia, femoribus obovatis, membranaceis; tibiis recurvatis, concavis.

"In *Mari mediterraneo*. Mirum in suo genere Animal Oculorum forma, et Pedum numero. Singularis architecturæ inhabitat domum, cubico-ventricosam, rugosam, gelatinosam, rigidam, utroque extremo patulam. Hic residet incurvum, sæpe situm mutans: his cunis ova deponit pullosque excludit."

On page xxi. it is briefly described with the words "pedibus utrinque 10; domifex."

1775. Müller, Philipp Ludwig Statius, born 1725, died 1776 (Hagen).

Physicalische Belustigungen oder Microscopische Wahrnehmungen in- und ausländischer Wasser- und Landthierchen durch Martinus Slabber. Aus dem holländischen übersetzt von P. L. St. Müller. Mit fein illuminirten Kupfertafeln. Nürnberg, 1775.

In this translation the account of *Phtisica marina*, *i.e.*, *Proto ventricosa*, occurs on pages 41–43, tab. x. fig. 1, 2. The account of *Oniscus arenarius* or Sandasselwurm is on pages 48–52, tab. xi. fig. 3, 4. At page 52 the translator gives the following note on his own part. "I cannot find the relationship of this species to either of the genera above-mentioned [*Squilla* and *Oniscus*], since the remarkable structure of the feet must certainly be regarded as a characteristic. And I think the author might have regarded this little animal as forming a quite distinct genus, and under the name Haustorius *arenarius*, or Sandschöpfer, I would place it in a genus by itself between the Monoculi and Onisci. If it were not for the absence of a carapace (Schild), I should not hesitate to place it among the Monoculi; it is best therefore to place it in a genus by itself."

Bovallius, who adopts the name *Pterygocera arenaria* assigned to this Amphipod by Latreille, after praising the figures and description of it given by the Dutch naturalist, makes the following observations:—"Although appreciating its numerous peculiarities, Slabber nevertheless abstained from creating a new genus for its reception, and placed it in the genus *Oniscus L.*, one of the three great Linnean genera, into which the whole of the Crustaceans, known at his time, were distributed, thereby also indicating his impression of its affinity to the Isopods of the present day. Statius Müller, his German translator, observed that the animal might be the type of a genus of its own, for which he proposed the name *Haustorius*, but this appellation, being an adjective, and consequently contrarious to the rules of Linnean nomenclature, has been justly forgotten." On the other hand, I venture to suggest that the reason mentioned is not sufficient to justify the rejection of *Haustorius* in favour of *Lepidactylis*.

The British Association Rules, 1878, include that against "Adjective generic names" only among "Recommendations for improving the Nomenclature *in future*." *Lepidactylis*, scale-fingered, is itself an adjective. *Anonyx*, *Eunoyx*, *Eurytenes*, and many other approved names of genera, are adjectives. *Haustorius*, on the other hand, not being an actual Latin word at all, can scarcely be an adjective, while the termination *-ius* is kept in countenance by the comparatively recent change of *Calliope* into *Calliopius*. The excellent name *Sulcator* might well have been allowed to stand, but since that has been displaced, on grounds of priority, first by *Pterygocera* and then by *Lepidactylis*, it seems only just to go back a step further to Müller's *Haustorius*.

1775. Fabricius, Johann Christian, born 1742, died 1807 (Biographie Universelle), born 1745, died 1808 (Enc. Brit., 9th Ed.), or died 1810 (see Hagen).

Systema Entomologiæ, sistens Insectorum Classes, Ordines, Genera, Species, adjectis synonymis, locis, descriptionibus, observationibus. Flensburgi et Lipsiæ, 1775.

In the Prolegomena, after commenting on the confusion which had prevailed in entomology before, and even since, the labours of "the immortal Linné," he says, "Novam ideo viam tentabo, characteres et classium et generum ex instrumentis cibariis desumens. Præbent sane sufficientes, præbent constantes et genera multo naturaliora." He proceeds to describe in general the labia upper and lower, the maxillæ upper and lower, the palpi, 2, 4, or 6, the lingua spiralis, the rostrum, proboscis, and haustellum. Specific differences he takes from colours (coactus) against his better judgment. The classes of insects are eight, "Os maxillis palpisque quatuor aut sex." They are named Eleuterata, Ulonata, Synistata, Agonata, Unogata, Glossata, Ryngota, Antliata. The Agonata are defined "Os palpis quatuor, aut sex. Maxilla inferior nulla." This class includes *Scorpio*, *Cancer*, *Pagurus*, *Scyllarus*, *Astacus*, *Gammarus*. Among the definitions of these are "125. Cancer. *Palpi* quatuor os obtegentes. *Antennæ* quatuor filiformes; posticis articulo ultimo bifido," and "129. Gammarus." "*Antennæ* quatuor simplicissimæ, sessiles: anticæ breviores, subulatæ, posticæ setaceæ." This latter contains the species *Gammarus locusta*, *Gammarus pulex*, *Gammarus linearis*, *Gammarus salinus*, *Gammarus stagnalis*, of which the first three correspond respectively to the numbers 82, 81, 83 of the Systema Naturæ, ed. xii., the remaining two not belonging to the Amphipoda. It should be remembered that the name *Gammarus*, which had hitherto been a specific name among Stalk-eyed Crustacea, now becomes a generic name among the sessile-eyed.

Among the Synistata, "*Os palpis quatuor. Maxilla inferior connata cum labio*," on page 296, is given a definition of *Oniscus*:—"93. Oniscus. *Labium* quadrifidum: laciniis intermediis palpigeris. *Antennæ* setaceæ." Among the *Onisci*, descriptions referring to Amphipoda (of Gammarina 1, Hyperina 3, Caprellina 1) are given as follows:—

"2 *caudatus*. 9. O. semicylindricus, caudis duabus longitudine corporis, *Linn. Syst. Nat.* II. 1060. 8. *Fn. Sv.* 2062. Habitat in Oceano Norwegico.

"*spinosus*. 13. O. oblongus, corpore spinoso, pellucido.

"Habitat in Oceano Atlantico. *Mus. Dom. Banks.*

"Corpus medium, gelatinoso-membranaceum, pellucidum. Caput magnum, rotundatum, obtusum, marginibus spinulosis. Oculi maximi, contigui. Antennæ duæ simplices, setaceæ. Segmenta corporis undecim sensim angustiora, carinata, carina spinulosa. Abdomen subtus foliolis sex ovatis obtegentibus. Cauda brevis, foliolis quatuor bifidis. Pedum septem paria, 1. 2. brevia, chelata, approximata, 3. 4. 5. 6. longiora, angulata, angulis spinulosis, articulo ultimo subulato, simplici, 7. breve, articulo ultimo clavato unguiculato.

"*gibbosus*. 14. O. oblongus, gibbus, antennis plicatis, longissimis.

"Habitat in Oceano Lusitanico. *Fig. pict. in Mus. Bankiano.*

"Corpus parvum, glabrum, læve, flavescens, punctis fuscis irroratum. Caput crassum, obtusum, oculis duobus maximis approximatis, macula magna viridi. Antennæ duæ setaceæ, sub corpore inflexæ et plicatæ, corpore triplo longiores. Thorax gibbus, segmentis septem, primo brevissimo. Abdomen segmentis quatuor. Cauda foliolis tribus, acuminatis, fissis. Pedes 14, intermediis sublongioribus.

"*quadricornis*. 15. O. oblongus, stylis caudalibus senis, antennis quaternis. Habitat in mari Atlantico. *Mus. Banks.*

"Corpus parvum, gibbum, glabrum. Caput retusum. Oculi maximi, macula magna lunata,

viridi. Antennæ quatuor setaceæ, longitudine corporis. Corpus segmentis duodecim, ultimo planiusculo, ovato, integro. Cauda exserta, stylis sex acutis, integris. Abdomen subtus foliatum. Pedes 14. subequales.

"*Ceti*. 16. O. ovalis, segmentis distinctis, pedibus tertii quartique paris linearibus, muticis. *Linn. Syst. Nat.* 11. 1060. 6, *Fn. Sv.* 2056 : *Mus. A. F.* 1. 89. Habitat in Balaenis. Ab hoc genere differre videtur mihi haud rite notus."

Among the Antliata the definition of *Pediculus* is as follows :—"184. Pediculus. *Os* haustello atque proboscide. *Haustellum* retractile, recurvum. *Antennæ* subulatæ." Under this genus, on p. 810, though, as will be seen, with doubts, he retains the confusion which Linnæus had introduced between Martens' whale-louse and Brünnich's *Pycnogonum*, in the following entry :—"*Balænarum*. 35. P? abdomine dilatato, muricato, rostro porrecto, subulato.

"Phalangium balæ̈narum, *Linn. Syst. Nat.* 11. 1028. 6.

"Pediculus ceti, *Mart. Spitz.*, 85, Tab. Q. fig. d.

"Pediculus ceti, Bast. subs. v. 2. tab. [pars] 3. 146. [156] tab. 12. fig. 3.

"Phalangium littorale, *Strœm. Søndm.*, 209. tab. 1. fig. 17.

"Pycnogonum, Brünnich. Ins. tab. 1. fig. 17.

"Habitat in Oceano Norwegico.

"Hujus generis videtur mihi haud rite notus."

Cystisoma neptuni, Guérin, 1842, which had anticipated *Thaumops pellucida*, Willemoes-Suhm, must obviously itself yield priority to *Oniscus spinosus*, Fabr., above-described.

1776. Pallas, P. S.

Reise durch verschildene Provinzen des Russischen Reichs. Dritter Theil. Vom Jahr. 1772, und 1773. St. Petersburg, 1776.

On page 709 he describes *Oniscus muricatus*—"*Magnitudo* fere Squillæ vulgaris, sed conformatio quæ Oniscis squilliformibus reliquis. *Segmenta* corporis septem, caudæ tria priora utrinque ad dorsum aculeo conico mucronata. *Pedes* 4 priores cheliferi, primi minores. *Cauda* stylis sex terminata, quorum duo medii breviores, crassioresque. *Color* vivi cinerascente-albidus; siccati, cocti vel a liquore spirituoso conditi coccineus. In Angara inferiore circa morticinia et quisquilias aquæ injectas colligitur copiose." He appends a note that a description of this species is to be found in the ninth fasciculus of the *Spicil. Zool.*, p. 52, but that the figure there is not a good one, in particular the dorsal spines being omitted. Its seems therefore clear that *Oniscus cancellus* is here for some reason renamed. Herbst mentions that in the German translation of the Spicilegia *Oniscus cancellus* is called *Oniscus muricatus*.

1776. Bomare, Jacques Christophe Valmont de, born 1731, died 1807 (Hagen).

Dictionnaire raisonné universel d'histoire naturelle, &c., &c. Troisième Edition, revue et considérablement augmentée par l'Auteur. Tome Septième. A Lyon, M.DCC.LXXVI.

Under "Pou de Baleine, *pediculus ceti*," p. 314, will be found an account, not of *Cyamus*, but of a Cirripede, probably *Coronula diadema*. It is "un animal testacée, commun dans les mers du Nord." "Quand on presse avec les doigts ce coquillage encore vivant, il répand une liqueur noirâtre. Sa tête ne se montre guère à découvert; elle est presque toujours cachée sous son enveloppe pierreuse." "Cette coquille est percée dans le milieu d'un trou rond; divisée en plusieurs cellules étroites et profondes." Nevertheless a reference is given

to "*Seba* (*Thes.* 1, *Tab.* 90, *n.* 5,)" which is the figure of a *Cyamus*. The writer notices that Seba mentions also "poux marins de Groënland, qui font la nourriture des baleines."

On p. 361, "Puce de mer, *psillus marinus*, est un petit animal carnassier, qui se trouve en grand quantité sur les bords de la mer du Cap de Bonne Espérance." Its name is derived from its power of leaping. It is armed "d'un petit aiguillon," by which it fixes itself on to fish and drives them to desperation. Rondelet's account of the ape-like shrimp is then given, with the concluding remark, "Peutêtre que les puces de mer sont le même animal connu à Amboine et à Banda, sous le nom de Fotock, *voyez ce mot.*" Under "Fotok," Tom. 3, p. 550, he only says, "*Voyez* Pou de mer." There may be other information of importance in other parts of this work and in the three other editions of it. I have given specimens to encourage research. The Danish translation by H. v. Aphelen is dated, according to Hagen, 1767–1770, and must have been made therefore from the first or second edition.

1776. Müller, Otto Friedrich, born 1730, died 1784 (Hagen).

Zoologiæ Danicæ Prodromus seu Animalium Daniæ et Norvegiæ indigenarum characteres, nomina, et synonyma imprimis popularium. Auctore Othono Friderico Müller. Havniæ, CIↃ DCC LXXVI.

Animals are here divided into six classes, the Insecta being the fifth. The Insecta include seven orders, of which the Aptera are the last. Among the Aptera (p. xxvii.) he gives "c. *Crustacea*," with the genera Polyphemus, Cyclops, Squilla ("*Pedes* 10 vel 14. *Antennæ* 4 integræ"), Cancer ("*Pedes* 10. *Antennæ* 2 integræ"), Oniscus ("*Pedes* 14. *Antennæ* fractæ"), Scolopendra and Julus.

Under the genus Cancer, pp. 196–197, he gives:—

"2353. C. *gavialis*, semicylindricus, corporis segmentis octo subæqualibus.† Linn., Mant. 542.

"2354. C. macrourus teretiusculus, corporis segmentis octo, pedibus duobus chelatis. Linn. Mant. 542. bini hi Squillis potius annumerandi, ultimus *S. lobatæ* affinis videtur.

"2355, C. *Medusarum* antennis brevissimis, corpore latiore. Gr. *Urksursak*. Str. *S.* 1. p. 188. t. 1. f. 12, 13.

"2356. C. macrourus thorace antrorsum aculeato, pedum paribus 10; cauda foliacea. I. *Kampa-Lampa*. Isl., R. 899.*†

"2357. C. macrourus articularis, manibus adactylis, femoribus posticis orbicularibus, spinis caudæ bifidis. Act. Havn. 9. p. 588. t. 8.

"2358. C. macrourus articularis, dorso carinato serrato, spinis caudæ bifidis. A. Havn. 10. p. 5. t. 2. f. 1–8. Cancer Str. S. 1. p. 180. 4. Gr. *Arksegiansoak* quinam? *Krabbe* nom. gen. Aph. 4, 451."

Under the genus Squilla—

"2359. Squilla *lobata* pallida pellucida, lobis intermediis quatuor, pedibus decem unguiculatis. Gr. *Nupparseriak* vel *Illærak*. Canc. *linearis* vel *filiformis* perillustris a Linné.

"2360. S. *ventricosa* rubra depressa, pedibus quatuordecim setaceis secundo pari clavato. A. Helv. 4. t. 4. f. 8, 9, 10*."

Under the genus Oniscus—

"2362. O. *volutator* antennis crassis abdominis longitudine. O. *bicaud.* Linn. antennas vero pro cauda sumsit."

"2366. O. *pulex* compressus; pedibus quatuor anticis cheliformibus. N. *Marylue*. I. *Marylo*. Gr. *Kinguk* Str. S. 188. Aph. 2, 399; 5, 235. Cancer Linn. In littore maris & in ripis amnium & lacuum frequens."

Aph. stands for "Bomares Natur-historie af H. von Aphelen."

On p. 280 Müller says, with a reference to No. 2358, "*Arksegiarsoak* augmentativum ex Arksegiak nom. Cancri gener." On p. vii, abbreviations, &c., are thus explained, "Species asterisco* notatæ in scriptis perillustris equitis a LINNE frustra quæruntur, signo † impressæ a civibus, signo + a me, detectæ indicantur. Nomina vernacula, quibus nulla litera majuscula anteponitur Danis et Norvegis communia sunt, reliqua *D. Danos*, *N. Norvegos*, *I. Islandos*, *L. Lappones*, Gr. *Groenlandos* significant."

Of these species No. 2355 is generally accepted as *Hyperia medusarum*, Müller; No. 2356 remains obscure; No. 2357 repeats Ström's description from the Acta Havn., 1765, of what is probably *Orchestia gammarellus*; No. 2358 in like manner refers to Ström's species of 1770, now become *Amathilla homari*, Fabr.; No. 2359 is synonymous with *Caprella linearis* (Linn.), Bate; No. 2360 is now called *Proto ventricosa*, Müller; No. 2362 answers to *Corophium volutator*, Pall.; No. 2366 includes probably two or three species, such as *Gammarus locusta* and *Gammarus pulex*. No. 2353, *Cancer g(l)acialis*, is probably not an Amphipod; No. 2354 may be a *Caprella*.

1776. FORSKÅL, PEHR.

Icones rerum naturalium, quas in itinere Orientali depingi curavit Petrus Forskål, Prof. Haun. Post mortem auctoris ad REGIS mandatum æri incisas edidit Carsten Niebuhr. Hauniæ, MDCCLXXVI.

In the Explicatio Tabularum, under Tab. XLI., is given the reference, "D. d. CANCER sedentarius. Pag. 95, n. 59." Figure "d" is a recognisable figure of *Phronima sedentaria* free; figure "D" represents it in its semitransparent case. For the description of this species, see note on Forskål, 1775.

1777. FABRICIUS, J. C.

Genera Insectorum eorumque characteres naturales secundum numerum, figuram, situm et proportionem omnium partium oris adjecta Mantissa specierum nuper detectarum. Chilonii. (Prolegomena dated Kiliæ die XXVI Decem. 1776.)

Here the genus *Scorpio* is transferred to Class V., the Unogata. The other five genera of the Agonata are retained in the same order as in his earlier work. The account of the genus *Gammarus* is as follows:—"GAMMARUS. Cancer Linn. Geoff. Oniscus Pallas. *Os* mandibulis palpisque absque maxillis. *Palpi* sex, inæquales, filiformes; anterioribus quatuor porrectis, os obtegentibus. *anteriores* longiores, compressi, bifidi: lacinia interiori quadriarticulata; articulo ultimo incurvo, exteriori breviori, vix articulata. *medii* paullo breviores, bifidi; laciniis subæqualibus; interiori triarticulata, exteriori subulata, acuta. *posteriores* breves, filiformes, triarticulati mandibulæ dorso inserti. *Mandibulæ* brevis, cornea, crassa, fornicata, obtusa, vix dentata, dorso palpigera. *Labium* triplex membranaceum. *exterius* quadrifidum: laciniis subæqualibus, linearibus. *medium* bifidum: laciniis rotundatis, divisis, æqualibus. *interius* bifidum; laciniis æqualibus, rotundatis, extrorsum crassioribus, divisis. *Antennæ* quatuor inæquales, pedunculatæ, simplicissimæ. *anteriores* breviores, subulatæ; pedunculo biarticulato. *posteriores* longiores, setaceæ; pedunculo triarticulato. *Metamorphosis* completa larva puppaque omnibus partibus completis, agilibus. *Victus* e rapina minimorum aquatilium plantisque aquaticis," pp. 142, 143. The species *grossipes* is

thus entered on p. 248 :—"*grossipes*. 1. Gammarus manibus adactylis longitudine corporis. *Cancer grossipes*, Linn. Syst. Nat., 2, 1055, 80. *Astacus* muticus pede antico subulato edentulo longissimo crassissimo, Gronov. Zooph., 989, tab. 17, fig. 7. *Oniscus volutator* Pallas Spic. Zool., fascic. ix. p. 59. tab. 4. fig. 9. Habitat in Europæ aquis stagnantibus."

1777. Pennant, Thomas, born 1726, died 1798 (Webster).

British Zoology, vol. iv., Crustacea, Mollusca, Testacea. London, MDCCLXXVII.

In his advertisement he says, "In my arrangement of the present work, I have taken the liberty of making a distinct class of the Crustaceous Animals; and separated them from Insects, among which they are usually placed." Among the lobsters, *Astacus*, which he defines with the words "Cylindric body. Long antennæ. Long tail," he places "*Cancer linearis Lin. syst.* 1056. Lesser garnel or shrimp. *Martens*, Spitzberg. 115. tab. P. fig. 1," "with long slender claws, placed very near the head." From the figures, pl. xvi. fig. 31, it is pretty clear that these "claws" are the antennæ, and that *Corophium volutator*, Pallas, is intended, the two references being quite inappropriate. He next gives "*Cancer atomos.* Lin. syst. 1056. Mirum animalculum in corallinis, &c., Baster, 1, 43, tab. iv. fig. 11." He mentions for this "a slender tail between the last pair" of legs, which would apply to *Cercops*, but the figure, pl. xii. 32, gives no pleon. He gives "C. Pulex. Lin, syst. 1055, No. 81," "very common in fountains and rivulets," probably *Gammarus pulex*, and "*C. locusta.* Lin. syst. 1055, No. 82," "which leaps about with vast agility," and which may therefore refer to *Orchestia* or *Talitrus*, or both.

1778. De Geer, Carl, born 1720, died 1778 (Biographie Universelle).

Mémoires pour servir à l'histoire des Insectes, Par M. le Baron Charles De Geer. Tome septième. Ouvrage posthume. A Stockholm, M.DCC.LXXVIII.

On pages 525–533 he describes "*Squilla* (Pulex) *aquatica, corpore compresso, pedibus quatuor anticis, chelatis, cauda setis sex bifurcis terminata,*" with references to Gronovius, Zooph. 990., Linn. Syst. Nat., ed. 12, p. 1055, 81. Geoffr. La crevette des ruisseaux, Ray, Frisch, Klein, Roesel, and Baster. From the remarks which he quotes from various authors, we may suppose that he regarded *Orchestia*, *Talitrus*, *Gammarus locusta*, and the like as all agreeing with *Gammarus pulex*, which is apparently the actual subject of his description and of plate 33. On pages 540–544 he describes "*Squilla* (Balæni) *corpore ovali depresso; segmentis distinctis, pedibus cheliferis: tertii quartique paris linearibus muticis,*" with references to "*Oniscus* (Ceti) *ovalis*," &c., Linn. Syst., ed. 12, p. 1060, No. 6, and Martens Iter Spitsb., Tab. Q, fig. D. This he figures on pl. xlii. figs. 6–10. In the detailed description, in regard to "les pattes de la troisieme et quatrieme paire," he says, "Elles sont longues, deliées, filiformes et très-flexibles, de grosseur partout égale et à l'extrémité arrondie, où l'on ne trouve ni ongle, ni crochet, en sorte qu'elles ressemblent plûtôt à de longs filets qu' à des pattes." Nevertheless, in the enlarged figure he gives them the appearance of being triarticulate, probably under the impression that if they were feet, they must be jointed. He also quotes the observation from Martens, that when the animal is sucking the skin of the whale, these four filiform feet are elevated over the back, so as to touch from opposite sides, and specimens, he says, in his own collection show them in this position.

1779. Fabricius, Johann Christian.

Reise nach Norwegen, mit Bemerkungen aus der Naturhistorie und Oekonomie. Hamburg, 1779.

At page 247 Fabricius says, "Unter den Insekten ist nichts seltenes; doch fand ich eine Menge kleiner Krebse, in Weingeist aufbewahrt, die in Norwegen unter den Namen Aat bekannt sind. Dieses Aat schwimmet in Sommer bey warmer Witterung in unendlicher Menge in der See. Man kan keiner Eimer voll Wassers schöpfen, ohne Millionen dieser Thiere mit herauszuziehen. Diese sind es, welche den Fischen, insonderheit den Heringen, zur Nahrung dienen, sie unter das Land locken, da sie ihnen immer folgen, wie der Wind und der Strohm sie treiben. Dieses Aat oder diese Krebsarten scheinen daher wenigstens mit die Ursache zu seyn, warum sowol die Menge der Fische, als das Glück der Fischereyen so sehr vom Strohme und dem Winde abhängt. Ich beschrieb hier

"*Astacus Homari* antennis posticis bifidis, corporis segmentis dorso subspinosis, caudæ stylis serratis.

"*Cancer* dorso carinato, serrato, Stroem. Act. Hafn. x. pag. 5. tab. 2.

"*Cancer* macrourus articularis, dorso crenato serrato, spinis caudæ bifidis, Müll. Zool. Dan. 197. 2358.

"*Hummer Aat* Norvagis.

"Magnitudine differt; mox maior, mox minor invenitur. Antennæ quatuor pedunculatæ, setaceæ posticæ bifidæ laeinia exteriore minore. Caput ouatum absque vllo rostro. Corpus segmentis 13. vltimis dorso elevatis, acutis, subspinosis. Pedes vnguiculati septem parium, interne lamina magna, ouata, obtusa suffulti; Natatorii trium parium apice fissi. Caudæ styli plures, serrati."

This species Fabricius seems afterwards to have regarded as the type of his genus *Gammarus*, and since the references identify it with what has since been known as *Amathilla sabini*, Leach, with which the description fairly corresponds, there seems no reason for withholding from the specific name given by Fabricius its right of priority. The species should therefore be called *Amathilla homari*, Fabr.

On page 258, after mentioning the occurrence of *Gammarus locusta* in great numbers at small depths, he describes:—

"*Gammarus longicornis* manibus adactylis, antennis corpore longioribus cauda obtusa.

"*Gammarus crassipes* Gen. Ins. App.

"*Cancer crassipes* Linn. Syst. Nat. 2. 1055. 80.

"*Oniscus volutator* Pall. Spicileg. Zoolog. fasc. ix. p. 59. tab. 4. fig. 9.

"*Astacus* muticus, pede antico subulato, edentulo, longissimo, crassissimo Gronov. Zooph. 989. tab. 17. fig. 7.

"Parvus. Antennæ anticæ breves subulatæ, posticæ porrectæ, crassæ, corpore longiores. Articulus secundus apice interiori vnidentatus. Corpus griseum, immaculatum. Pedes trium parium adactyli. Cauda obtusa: lamella vtrinque vnica."

Why he rejects the earlier specific names, he does not explain. In the synonymy he seems to have used the word *crassipes* twice by mistake for *grossipes*, misled perhaps by Gronov. See Note on Pallas, 1766. What is meant by "Gen. Ins. App." I have not been able to discover. It may refer to some appendix prepared but not published. In the Species Insectorum, 1781, the reference is not repeated.

On page 326, he says, "Unter den grossen *Medusis* hielt sich ein kleiner *Gammarus* auf, der mir noch gleichfalls unbekannt war.

"*Gammarus medusarum*, manibus quatuor monodactylis, capite obtusissimo.

"*Pulex cancriformis*, Stroem Sundm. Tab. 1. figs. 12. 13.

"*Cancer medusarum*, antennis brevissimis, capite latiore. Müll. Zool. Dan. 188. 2355.

"Corpus paruum, incuruum, antice obtusissimum. Antennæ quatuor breuissimæ, filiformes, simplices. Abdomen postice attenuatum. Cauda filiolis quatuor bifidis. Pedes septem parui, breues. Natatorii utrinque tres."

This description is accepted as applying to *Hyperia medusarum*, O. F. Müller.

At page 383 he describes the new species :—

"*Gammarus corniger* manibus adactylis, rostro incurno subulato, thoracis lateribus cornu duplici.

"Medius in hoc genere. Antennæ quatuor æquales filiformes, simplices, albæ. Rostrum breue, subulatum, acutum inter antennas incuruum. Oculi magni, sessiles, cinnabarini. Corpus segmentis vndecim breuibus albidis margine sanguineis, posticis quinque dorso carinatis, spinosis. Sub thoracis lateribus vtrinque cornua duo basi connata, valida, subulata, acuta : anteriori arcuato. Cauda stylis pluribus bifidis."

This has since been recognised by Boeck as identical with *Epimeria tricristata*, Costa, and is accordingly named *Epimeria cornigera*, Fabr.

1780. Fabricius, Otto, born 1744, died 1822 (Hagen).

Fauna Groenlandica, systematice sistens Animalia Groenlandiæ occidentalis hactenus indagata, quoad nomen specificum, triviale, vernaculumque; synonyma auctorum plurium, descriptionem, locum, victum, generationem, mores, usum, capturamque singuli, provt detegendi occasio fuit, maximaque parte secundum proprias observationes Othonis Fabricii. Hafniæ et Lipsiæ, MDCCLXXX.

On pp. 212, 213, No. 179, he describes a *Podura maritima* from the sea shore, with a reference to Ström, Act. Hafn. ix. p. 582, Tab. v. (?), which does not appear to be a Crustacean, and must therefore be distinguished from Poda's *Podura maritima*.

Squilla lobata, p. 248, for which he refers both to *Squilla lobata*, Müller, and to *Cancer filiformis*, Linn., Pall., may be either *Caprella septentrionalis*, as supposed by Krøyer in 1838, and afterwards by Boeck, probably on Krøyer's authority, or *Caprella linearis*, as Mayer seems to prefer, while half inclined to make *septentrionalis* itself a synonym of *linearis*.

The *Oniscus ceti*, No. 230, as Lütken points out, is not entirely free from the early confusion about *Cyamus*. The definition is taken with slight change from Linnaeus, and the description by Pallas is referred to as making further details needless, although both Linnaeus and Pallas had to do with *Cyamus mysticeti*, while Fabricius was evidently concerned with what Lütken has named *Cyamus boopis*, as shown by the statement "mea exemplaria accepi in balaena boope." Lütken remarks also that Fabricius is wrong in the detail supplied by the words "femora postica biaculeata."

Oniscus pulex, No. 231, is no doubt, as Krøyer and Boeck say, *Gammarus locusta*. Fabricius himself in the synonymy gives "*Cancer Locusta*, Syst. nat. 1, 1055, Faun. Suec. 2041. indice Pallade l. c. huc pertinet; et certum est, descriptionem caneri coerulei It. Gothl. 260. ibi citatam Oniseo pulici omnino convenire, licet ab autore ipso pro distincto habitus."

Oniscus medusarum, No. 232, is by Bovallius (1886), called "*Hyperia Kroeyeri*."

Oniscus cicada, No. 233, with "color totus pulchre rubicundus, oculis sanguineis," is considered by Krøyer, in 1838, to be probably the same as his own *Amphithoë inermis*. Milne-Edwards, in 1840, Hist. des Crust., iii. p. 25, thinks that it is very likely the same as the *Amphitoe serra* of Krøyer, which he would place in the genus *Acanthonotus*, Owen and Ross. But on p. 34 of the same volume he questions whether it may not be the same as *Amphitoë inermis*, Krøyer. Krøyer himself, Tidssk., iv. 161, note, in 1842, repudiates Milne-Edwards, first suggestion, and says, "*Oniscus cicada* is probably a species of the genus *Anonyx*." In

Tidsskr., ser. 2, vol. i. p. 611, in describing the new species *Anonyx gulosus*, he remarks in a note, "It is, however, possible that this species is not new. Fabricius' *Oniscus cicada* seems in many, if not in all, respects to come very near to it, and is obviously in any case an *Anonyx*. By means of the Greenland name this doubt seems capable of solution, at least if the name applies to but one species." With such testimony from Kroyer himself, it seems only just to reduce his *Anonyx gulosus* to a synonym of *Anonyx cicada*, O. Fabricius. It shares with the so-called *Gammarus arcticus*, Scoresby, the reputation of exercising extreme voracity upon dead seals.

Oniscus abyssinus, No. 236, Kroyer in 1838 identifies, though very hesitatingly, with his own *Amphithoë crenulata*. Subsequently Kroyer united *Amphithoë crenulata* and *Amphithoë inermis* as the two sexes of one species, which Boeck places in his genus *Pontogeneia*, as *Pontogeneia inermis*.

Oniscus serratus, No. 237, Krøyer, in 1838, renamed *Amphithoë serra*, and afterwards *Acanthonotus serra*. Boeck calls it *Acanthonotozoma serratum*, the generic names *Acanthonotus*, Owen, and *Vertumnus*, White, to which this species had been successively assigned, being both preoccupied.

Oniscus arenarius, No. 234, is defined as "Oniscus cancriformis, antice depressiusculus, postice carinato-subserratus, pedibus 4 anticis cheliformibus lævibus, antennis subæqualibus," followed by Ström's definition in the synonymy, "*Cancer macrourus articularis, manibus aluetylis, dorso carinato serrato, spinis caudæ bifidis*, Act. Hafn. x. 5. Tab. ii. f. 1–8 et Müll. prodr. 2358?" The references imply that *Amathilla homari*, Fabr., 1779, is intended, a species as to which Kroyer, Grönl. Amph., expresses his surprise that one so large should not have been noticed by Otto Fabricius. The name *Oniscus arenarius* is preoccupied by Slabber.

Oniscus Stroemianus, No. 235, is defined as "Oniscus cancriformis compressus, pedibus 4 anticis cheliformibus subdentatis, antennis summis brevissimis," followed by Ström's definition, Act. Hafn. ix. 588, Ström being spoken of as the discoverer. Ström's species is identified by Boeck with *Orchestia* (*littorea*) *gammarellus*.

1780. De Quéronic.

Description d'un Insecte singulier trouvé dans la rade de Lomariaker. Mém. de Math. et de phys. prés. à l'Académie Royale des Sciences, Paris; Tom. IX. Paris. M.DCC.LXXX., p. viii. and pp. 329–330. (Présenté le 4 Juillet 1767.)

The "insect" from Morbihan which he figures, and describes as Puce de mer *arpenteuse*, giving the latter epithet from its mode of walking, is clearly the skull-headed skeleton shrimp, *Caprella acanthifera*, Leach. Boeck says that de Quéronic "figures a *Caprella* which seems to be the female of *Caprella linearis* and a variety of it, which has been made a separate species, *Caprella acuminifera*." This latter Mayer identifies with *Caprella acanthifera*, but inclines to regard de Quéronic's species as the two sexes of *Caprella tuberculata*, Bate and Westwood. It is, however, only the *Caprella acanthifera* which has the peculiar skull-like head figured by de Quéronic. There is nothing in his paper, either in the description or the figures, which are here reproduced, that refers to more than a single form. He draws it, indeed, in two postures, but without any intimation that the figures are taken from more than one specimen. His actual words are, "Notre insecte est couvert d'une écorce semblable à celle des Puces de mer, de même consistance, et aussi d'un rouge lavé, sur-tout après la mort de l'animal. C'est ce qui me porteroit à lui donner le nom de Puce de mer, auquel j'ajouterois celui d'*arpenteuse* pour caractériser sa marche. La figure A. représente l'animal de grandeur naturelle, et à-peu-près dans l'attitude où on l'a vu marcher.

B, est le même insecte vu à la loupe, et dessiné avec toute l'exactitude possible. L'œil qu'on lui voit à chaque côté de la tête, est pendant sa vie, ainsi que lorsqu'il est mort, du rouge le plus vif, semé de petits points jaunes. Sa gueule est ouverte comme celle des poissons, et non comme celle des crabes, écrevisses, etc. On l'a vu remuer les mâchoires qui ont plusieurs plis tels qu'ils sont représentés ; mais il n'a pas été possible d'appercevoir si l'intérieur est garni de dents, comme l'insecte de Ceylan. *CC*, sacs membraneux, velus, et

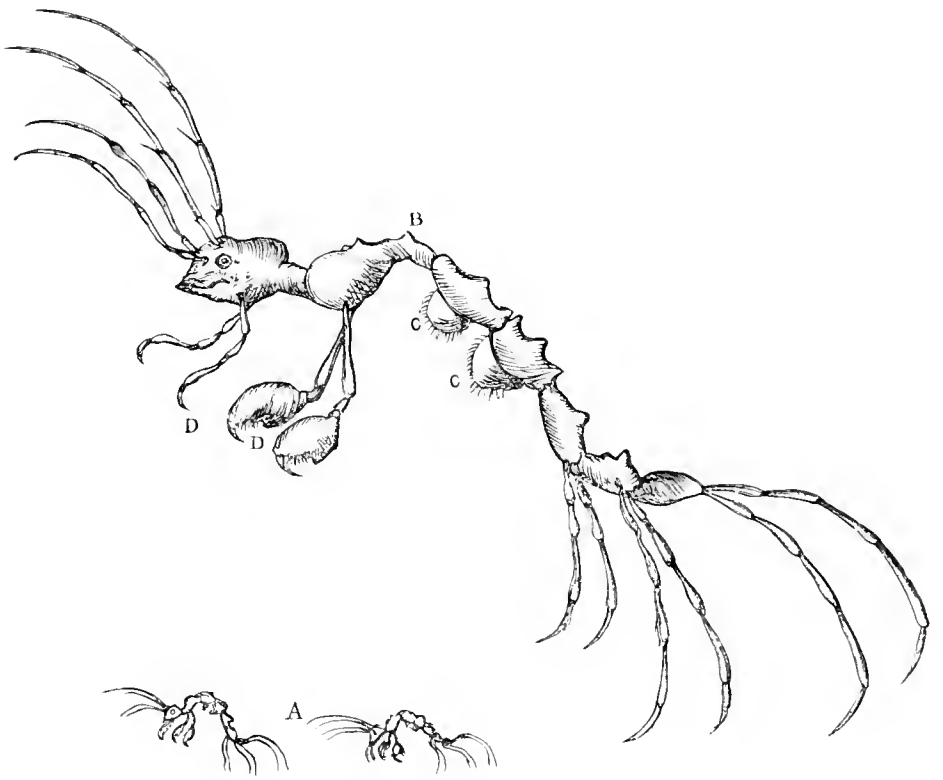


Fig. 14.

blancs, dont il y a deux de chaque côté, en dessous l'un du second, l'autre du troisième anneau. Ces sacs servent probablement à l'insecte, à se soutenir dans l'eau et à nager. *D*, bras garnis chacun d'un gros crochet, parfaitement semblable à celui qui termine tous les pieds de l'insecte de Ceylan. La comparaison de notre *figure* avec celle de M. le Commandeur *Godeheu*, *page* 276 du troisième volume des *Savans Etrangers*, fera voir en quoi ces animaux se ressemblent, et en quoi ils diffèrent l'un de l'autre."

1780. Lepechin, Ian. Lepekhin, Ivan Ivanovich (or Lepechin, Ivan), born " vers le milieu du 18ᵉ siècle," died 1802 (Biographie Universelle), born 1737, died 1802 (Hagen).

Tres oniscorum species descriptæ. Ab I. Lepechin. Acta Academiæ Scientiarum Imperialis Petropolitanæ. pro Anno MDCCLXXVIII. Pars prior. Petropoli. MDCCLXXX.

Of these three species, the second, *Oniscus scorpioides*, Tab. viii. fig. 2, is not an Amphipod ; the first and third are described as follows :—" Oniscvs acvleatvs. Tab. viii. Fig. 1. Oniscus

thorace nudo, dorso tribus ordinibus cuspidum notato. Descriptio. longitudo totius animalculi, exceptis antennis, XI linearum. Caput hemisphericum, oculi magni, protiberantes, coerulei. Os inferius situm in fouea rotundata pone insertionem antennarum, protuberans denticulis quatuor, quorum duo superiores, maxillam efficientes, validiores sunt, instructum. Antennæ IV. per paria dispositæ: par inferius magis validum quadriarticulatum: articulus capiti proximus breuissimus, secundus longior crassior que complanatus, tertius breuior secundo et debilior, quartus longissimus setaceus. Thorax semiouatus gibbus, segmentis VI. quorum vnumquodque in medio tuberculo, vix nudo oculo conspicuo, notatur; at in vltimo segmento inferior margo euidentibus cuspidibus armatur; reliquum corpus tribus constat scutis, quorum latera sunt plana in formam semilunæ efficta, in abdomine appendicibus trium parium pediformibus, articulatis, extremo setaceis, instructa; in dorso autem tribus ordinibus cuspidum armata, quorum debiliores medium dorsum, fortiores vero vncinnatæ, latera, occupant. Pedes VII. parium, quorum duo anteriora cheliformia, vnco acuto terminata, breuiora, reliqua longitudine crescunt, ita vt vltimum sit longissimum, quadriarticulatum, femora latiora fere triangularia."

"Onisevs evspidatvs. Tab. viii. Fig. 3. Oniscus thorace articulato, tuberculoso, segmentis dorsalibus VI, cuspidatis. Descriptio. Caput prominulum a thorace distinctum inæquale, oculis distinctis protuberantibus. Antennæ IV, quarum bases constant articulis cylindricis breuioribus, apex vero exit in setam longam attenuatam. Os inferne situm, instructum maxillis hamatis euidentibus. Thorax articulatus oblongus, segmentis IV, quorum vnumquodque tuberculis III, sat eleuatis, medio oblongiore, notatur; vltimum vero segmentum, praeter tubercula, cuspidibus IV dorsum respicientibus instructum. Dorsum et abdomen constant itidem segmentis IV, quæ sulcis profundis atque euidentioribus distinguuntur. Margo inferior anteriorum segmentorum armatur cuspidibus VI, ratione magnitudinis corporis, validis, vltimum vero segmentum, non nisi vnicam cuspidem in medio gerit. Cauda in formam penicilli efformatur ex laminibus attenuatis mollioribus. Pedes VII parium, quatuor articulis constantes. Horum anteriores teneriores, hispidi; vltimi vero validiores, femoribus crassioribus, complanatis, spina notatis; abdomen tegunt tria paria appendicum pediformium, basi solidiore sulcata, apice bifido filiformi. Longitudo totius, exceptis antennis, X linearum; color lateritius; locus, mare album."

The first of these Arctic species was again described as a new species by Sabine in 1821, under the name *Talitrus Edwardsii*, which Owen in 1834 changed to *Amphithoë Edwardsii* Milne-Edwards, probably by an oversight, omitted it from his Hist. des Crustacés. Krøyer in 1846 fully described it, but without reference to Lepechin, under the name *Amphithoë Edwardsii*, while Spence Bate in 1862, without reference to Kroyer, transferred it to Costa's genus *Amphithonotus* as *Amphithonotus Edwardsii*. Goës in 1865 gave it the name *Amphithonotus aculeatus*. Boeck in 1870 renamed it *Tritropis aculeata*, under the impression that Costa's *Amphithonotus*, 1851, was preoccupied, for he says in his larger work, p. 510, "Jeg har i 1870 indskrænket denne Slægts Omfang til de Arter, der staa nær *A. cataphractus*, Stimps., og ombyttet Slægtsnavnet, da det allerede forhen, i 1843, er af Fitz benyttet til et Reptil." Curiously enough, it is *Tritropis*, not *Amphithonotus*, which, not Fitz but Fitzinger uses for a genus of reptiles. In 1883 S. I. Smith changed Boeck's *Tritropis*, because it was thus preoccupied, into *Rhachotropis*. In 1874, that is, before the second volume of Boeck's last work was published, Buchholz restored the name *Amphithonotus aculeatus*, uniting with this species Boeck's *Tritropis Hellori*, but retaining the name *Tritropis fragilis* which Boeck had given to *Paramphithoë fragilis*, Goës. *Amphithonotus*, though not preoccupied, lapsed at its first institution as a synonym of *Dexamine*.

Fig. 3.

Fig. 15.

Oniscus cuspidatus, the remaining species, was supposed by Boeck in 1870 to be identical with Owen's *Acanthosoma hystrix*, 1835, which was renamed *Amphithoë hystrix* by Kroyer in 1838, and *Paramphithoë hystrix* by Bruzelius in 1859. The latter name was accepted in the Brit. Mus. Catal., the authors before Boeck not taking notice of Lepechin's *Oniscus*. Owen's name *Acanthosoma* being preoccupied, among Hemiptera in 1824 and elsewhere, was changed by Boeck into *Acanthozone*, who therefore calls Lepechin's species *Acanthozone cuspidata*. Under this name the species still stands, but upon the synonymy above-mentioned from Owen, Kroyer, and Bruzelius, which was accepted by Buchholz in 1874, E. J. Miers has since thrown doubt. See his Spitzbergen Crustacea, 1877, in which he points out that *Oniscus cuspidatus*, Lepechin, *Acanthosoma hystrix*, Owen, and *Acanthozone hystrix*, Buchholz, though all belonging to the genus *Acanthozone*, are probably distinct species.

1781. Fabricius, J. C.

Species Insectorum exhibentes eorum differentias specificas, synonyma Auctorum, loca natalia, metamorphosin adjectis observationibus, descriptionibus. Tom. I. Hamburgi et Kilonii, MDCCLXXXI.

The Agonata are here still the fourth class, with the genera, *Cancer*, *Pagurus*, *Scyllarus*, *Astacus*, *Squilla*, *Gammarus*.

On page 511, *Astacus* includes the following entry :—

"*Homari*. 7. A. antennis posticis bifidis, corporis segmentis dorso subspinosis, cauda faseiculata, stylis serratis. *Iter Norwag.* d. 18. Iul.*

"*Cancer* dorso carinato serrato. *Stroem.* Act. Hafn. X. pag. 5. tab. 2.

"*Cancer* macrourus articularis, dorso carinato serrato, spinis caudæ bifidis. *Müll. Zool. Dan.* 197. 2358.

"Habitat in Oceano Norwagico." For the probability that this species is in fact an Amphipod, the type-species of Bate and Westwood's genus *Amathilla*, see notes on Fabricius, 1779 and 1798.

On pages 515–518, *Gammarus* includes twelve species answering respectively to :—1. *Cancer ampulla*, Phipps; 2. *Cancer nugax*, Phipps; 3. *Oniscus cancellus*, Pallas; 4. *Cancer grossipes*, Linn., and *Oniscus volutator*, Pallas, but with the specific name *longicornis;* 5. *Gammarus locusta*, Syst, Ent. 418. 1., with references to Linnæus, Pallas, Sulzer, Frisch, Roesel, Klein, and the remarks, "Habitat sub Europæ maritimis frequentissimus, dorso innatans, etiam in fontibus et fossis. Conf. *Oniscus gammarellus*, *Pall. Spicil. Zool.* fasc. 9. 57. tab. 4. fig. 8.;" 6. *Gammarus pulex*, Syst. Ent. 418. 2. with references to Degeer, Ray, Baster, Gronov, and the remark, "Habitat ad Oceani littora frequentissimus, saliens, piscibus infestus, in branchiis vlcera caussans;" 7. *Gammarus corniger*, Iter Norwag.; 8. *Gammarus tinearis*, Syst. Ent. 419. 3., with references to *Cancer tinearis*, Linn., *Oniscus scolopendroides*, Pallas, to "*Mart. Spizb.* tab. *P.* fig. *I. Bast. subs.* 1. 32. tab. 4. fig. 2.," and the observation "*Cancer atomos*, *Linn. Syst. Nat.* 2. 1056. 84. vix differt.;" 9. *Gammarus salinus;* 10. *Gammarus stagnalis;* 11. *Gammarus esca;* the last-mentioned three not being Amphipoda; 12. *Gammarus* "*Medusarum*," Iter Norwag., with references to *Pulex*, *cancriformis*, Stroem, and *Cancer Medusarum*, Müll. Zool. Dan. Prodr. 2355. Of *Gammarus salinus* he notes two varieties and adds "An potius Monoculus?"

Among the Synistata, Class III., *Oniscus* includes, on pages 377, 378, the same Amphipods as in the Syst. Ent. of 1775. These are, 10. *Oniscus bicaudatus;* 14. *Oniscus spinosus*, which is Guérin's *Cystisoma;* 15. *Oniscus gibbosus*, transferred in 1787 to *Gammarus*, but properly, like the next species, belonging to the Hyperina; 16. *Oniscus quadricornis*, subsequently recognised as a synonym of *Gammarus medusarum;* 17. *Oniscus ceti.* While

curtailing some of the descriptions previously given, Fabricius enlarges that of *Oniscus ceti* with the following synonymy :—

" *Squilla Balænæ* corpore ouali depresso, segmentis distinctis, pedibus cheliferis, tertii quartique paris linearibus muticis. *Degeer Ins.* 7. 541. 6 tab. 42. fig. 6. 7.

" *Pediculus Ceti. Martens Spitzb.* tab. 8. fig. D.

" *Seb. Mus.* 1. tab. 90. fig. 5.

" *Pall. Spicil. Zool.* fasc. IX. 76. tab. 4. fig. 14.

" *Egede Groenl.* tab. 37.

" Habitat in Oceano boreali balænis molestus.

" Ab hoc genere differre videtur vlterius examinandus."

Thus Martens' whale-louse is rightly placed, and not, as in the earlier work, erroneously referred to *Pediculus* (?) *Balænarum*.

1781. Ödman, Samuel, born 1750, died 1829 (G. O. Sars).

Grundmårglan, *Cancer pulex*. Kongl. Vetenskaps Academiens Nya Handlingar För Månaderne Aprilis, Majus, Junius, År 1781, pp. 163–168.

For the *Cancer Pulex* here described he gives references to "Faun. Sv. N:o 2041. S. N. N:o 81. H:r Ströms Sönd.-Mör -l, p. 188. *Marglue*. Hammers Faun. Norv. N:o 735." The description is as follows :—" Cancer macrourus, manibus adactylis, thorace nullo. Antennæ IV, setaceæ, articulis 3 primis longioribus. Oculi nigri lunulati. Segmenta corporis XIII, capite excepto. 5 primis squama laterali munitis; 8, 9, 10, puncto sangvineo notatis (in vivo). Pedes primarii, 4 parium, quorum 2 par. antica chelifera, cum pollicis immobilis rudimento, inter squamas laterales latent. Pedes medii 3 par. longiores, ad segmentum 6 incipiunt. Pedes postici 2 par. minimi, bidigitati, sub ipsa cauda, rectrices. Styli 3 par. setacei, mutici sub abdomine (hi sunt pedes spurii Linnæi Locustæ, S. N. N:o 82). Cauda bifida, chela duplici pollice sursum posito. Corpus vivi fuscum, mortui rufescit, pellucidum. Magnitudo maris $\frac{2}{3}$ poll. Foem. dimidio minor. Wermdoensibus *Grundmårgla*." Ödman was doubtful whether the Crustacean mentioned in Linné's Ölands-resa, p. 42, and Gothlands-resa, p. 260, should be called *Pulex* or *Locusta*. It is clear from the account he gives of his own species that it is marine, and therefore not *Gammarus pulex*, but in all probability *Gammarus locusta*. See his further account 1799.

1781. Schrank, Franz von Paula, born 1747, died 1835 (Hagen).

Enumeratio insectorum Austriæ indigenorum. Avgvstæ Vindelicorum, MDCCLXXXI.

On page 535, under " Cancer, Krebs," he gives " 1114. Astacus, Flußkrebs followed by

" 1115. Pulex, Scitling.

" Cancer macrourus articularis compressus, manibus quatuor adactylis, pedibus decem.

" Cancer Pulex. *Scop. carn. n.* 1137.

" Krebsförmiger Wasserwurm. *Frisch. Ins. Deut. part.* 7. *p.* 26. § 18.

" *Habitat* in aquis, rivis, fontibus; albissimus, dum natat; cinereus, dum in aere exsiccatur; si vel modicus accedat calor, rubescit.

" Nomen germanicum Austriacis usitatum."

From the habitat " in rivis," it may be inferred that Schrank was acquainted with *Gammarus pulex*. From the habitat " in fontibus," coupled with the remark " albissimus, dum natat," it seems fair to suppose that he had also seen one of the well-shrimps, such as *Niphargus aquilex*.

1782. Berkley, Lefrancq de. Le Francq van Berkhey (Carus. Bibl. Zool.). John Le Franc van Berkley, born 1729, died 1812 (Maunders).

Johann Franz van Berkhey's Naturgeschichte von Holland, aus dem Holländischen übersetzt," has the first volume dated Leipzig, 1779, the second, Leipzig, 1782. This German translation of the work is the only one I have been able to obtain, and in the second volume the translator gives notice that he has taken the liberty of considerably curtailing the original. In point of fact, all the zoology seems to be omitted. From local notices in the work it may be inferred that the author's name was certainly van Berkhey.

"He published in Dutch a history of Holland, geographical, physical, natural, and civil, of which a French translation appeared in 1782. He was the first to change the Linnean classification of the Crustacea, forming them into a separate class, which he placed immediately before that of the Insecta. But besides that he only characterised his divisions in a complicated, vague, and often unmeaning way, he departs from the natural order, by placing the Testacea below the insects, so that the Crustacea come next to the bony fishes." Latreille, Consid. gen., pp. 18, 19, 1810. Compare note on Brisson, 1756, in regard to the question of priority, since in regard to arrangement the classifications by Brisson and Berkhey seem to have been practically the same.

1786. Mohr, Nicolas.

Forsøg til en Islandsk Naturhistorie, med adskillige œkonomiske samt andre Anmærkninger. Kiøbenhavn, 1786.

Among the Apterous Insects he gives, on page 107, "243, Cancer pulex (Faun. Svec. 2041). Marflo," which, he says, is not only in very great numbers on the strand, but also out in deeper water, where it does great damage, as well to the nets as to what is caught in them. He thinks that it would be difficult to get a sufficient supply of horse-hair for making the under part of the nets, which was the preventive believed in against these depredators.

For "244, Cancer medusarum," he refers to "Strøm's Søndm. Beskr. 188, Tab. 1, fig. 12, 13," and considers that the description and figures given by Strøm are very accurate, he himself having had the opportunity of comparing them with specimens taken from *Medusa aurita*.

246 is given as "Cancer macrourus articularis manibus adactylis femoribus posticis orbicularibus spinis caudæ bifidis (Act. Soc. Sc. Hafn. 9, D. 588, Tab. viii.), Ogn, Aat." It is like a little Marflue, but nearly white, with red eyes, and is much fatter, though smaller than the Marflue. Another species, like it, but much larger, is called by the inhabitants, Grønlands-Ogn, the presence of which indicated the speedy arrival of fish and whales. 247 is "Cancer filiformis (Syst. Nat. 1056), *Syrilla lobata* (Müll. Prodr. Zool. Dan. 2359)."

The Latin description of 246 relates to Strøm's *Orchestia*, 1765, whereas Mohr's own account of it probably refers to some species of *Anonyx*, at any rate not to an *Orchestia*. 247 is identified by Boeck with *Caprella septentrionalis*, Krøyer, but for this identification there seems to be no adequate ground. Mohr's own references have to do with *Caprella linearis*, Linn.

1787. Fabricius, J. C.

Mantissa Insectorum sistens eorum species nuper detectas adjectis characteribus genericis, differentiis specificis, emendationibus, observationibus. Tom. I. Hafniæ MDCCLXXXVII.

The Agonata here comprise seven genera, *Cancer*, *Pagurus*, *Hippa*, *Scyllarus*, *Astacus*, *Squilla*, *Gammarus*. *Gammarus* contains the same list of species as in the Species Insectorum of 1781, with the addition of *Gammarus gibbosus*. The reference to its synonym *Oniscus gibbosus* in the earlier work is misprinted 577 for 377. *Cancer linearis*, Pennant, is given as a synonym of *Gammarus longicornis*. *Oniscus bicaudatus* is retained among the Synistata, where also *Cyamus* is still represented by *Oniscus ceti*.

1788. Müller, Otho Fridericus (Otto Friedrich), born 1730, died 1784 (Hagen).

Zoologica Danica seu Animalium Daniæ et Norvegiæ rariorum ac minus notorum Descriptiones et Historia. *Volumen secundum* explicationi iconum fasciculi secundi ejusdem operis inserviens. Ad formam tabularum denuo edidit frater auctoris. Havniæ, MDCCLXXXVIII.

On pp. 20–21 is described *Squilla ventricosa*, "Squilla rubra depressa, pedibus quatuordecim setaceis secundo pari clavato. *Zool. D. pr.* 2360." On pl. lvi. this is figured together with *Squilla quadrilobata*. For the latter, on pp. 21–22, references are given to "*Zool. D. pr.* 2359." "Faun. groenl. 225." "Act. helv. 5. p. 368." "Cancer atomos, Linn. *Syst.* p. 1526." "*Brit. Zool.* 4, p. 17 f. 32." "Baster *subsecis*, i. t. 4 f. 2." "Oniscus *Scolopendroides*, Pall. spicil. 9. p. 78." The description is followed by these remarks: "Descriptio Caneri *linearis* et *filiformis* Linneani, synonymonque a *Martens* petitum nostræ Squillæ æque conveniunt, at citata Basteri figura Cancrum *atomum* esse jubet; in aquis *dulcibus fluctuantibus* habitare hallucinatione dictum est; cur in *fluctuantibus* non percipio. Cauda in figura Basteri certe errore delineata Linneum, ut has species cauda prorsus carentes *macrouras* seu longicaudas diceret, seduxit. Exactissimam clariss. viri Pallas, Gronovius et Otho Fabricius descriptionem dedere; ille a *Cancro* jure semovens *Onisco* junxit, hic mecum *Squillæ* vindicavit. Gronovius his insectis olim *Squillæ*, Linné dein *Cancri*, Pallas *Onisci* nomen constituerant: minus bene igitur in *systemate entomologiæ* novum *Gammari* nomen et quidem insecti maximi valde minutis effictum est. Vesiculas Gronovius pedes, pedum vicarias claris. Pallas quidem nominant, at nec pedes sunt, nec horum vices gerunt. Animal Zeylonicum G. de Riville in Mem. de Mathem. et Physique vol. 3 et Berl. Samml. vol. 9. p. 42, t. 1, f. 6 nostram vesiculis orbatam sistit." Müller's indignation at seeing the name *Gammarus*, which belonged specifically to that "very large insect," the common lobster, applied to a genus of "very minute" shrimps, does not appear wholly unreasonable. But if Fabricius committed an error of judgment in this respect, it is too late now to correct it.

1788. Linnæus. Gmelin, Johann Friedrich, born 1748, died 1804 (Hagen).

Systema Naturæ, editio decima tertia, aucta, reformata, cura Jo. Frid. Gmelin. Lipsiæ, 1788.

In this edition the Insecta Aptera are to be found at the end of "Tom. I. Pars. V." On page 2963, to the definition of *Cancer* is added, *Palpi* sex inæquales, *Mandibulæ* cornea, crassa,

Labium triplex. Under this extensive genus "Cancer," in the groups of species corresponding to the "Astaci Fabricii," is given, "*homari*. 155.," with references to Fabricius, Müller, and Stroem, and the observation "*Habitat in* Oceano norwegico, *minutus*" (p. 2987). The epithet *minutus* would be inapplicable to *Amathilla sabini* as an Amphipod, but would very well apply to it when grouped among the *Astaci*. It gives, therefore, an additional reason for supposing that *Astacus homari* was originally misplaced. See the note on Fabricius, 1779 and 1798. Under the same genus "Cancer," the group of species headed "*antennis pedunculatis simplicissimis*, Gammari Fabricii.," (p. 2991), includes, with the addition of *atomos* and *filiformis*, the same list as that given for *Gammarus* by Fabricius in his Mantissa, 1787. The Linnean name *grossipes* is reinstated for the species *Gammarus longicornis*. For "Cancer Pulex," besides the references in Fabricius, Spec. Ins., the following are given "*Geoffr. ins. par.* 2. *p.* 667. *t.* 21. *f.* 7. *Edm. nov. act. Stockh.* 1782. II. 9. *Hablizl ap. Pall. n. nord. Beytr.* 4. p. 396. *Habitat frequentissimus ad* Oceani *littora, etiam in fontibus, fossis, lacubus adeo Sibiriæ salsis, dorso innatans, saliens, in piscium branchiis ulcera excitando piscibus, et invisus retia destruendo piscatoribus infestus, a recurvirostra comestus, noctu lucens.*" After *Cancer linearis*. 83., is given "Atomos, 84. C. linearis, manibus adactylis, pedibus undecim. *Brit. zool.* 4. *t.* 12. *f.* 32. *Habitat in* Europæ *aquis fluctuantibus dulcibus, nudo oculo vix visibilis, an vere a lineari distinctus?*" and "filiformis. 85. C. linearis, pedibus decem, mediis majoribus. *Amœn. acad.* 6. *p.* 415. *n.* 99. *Habitat in* Malacca, *pollicis longitudine, debilis.*" For *Cancer medusarum* reference is made to "*Fabr. sp. ins.* 1. *p.* 378. *n.* 16. Oniscus (quadricornis) oblongus, stylis caudalibus senis, antennis quaternis.," as well as to "*Fabr. sp. ins.* 1 *p.* 518. *n.* 12. *mant. ins.* 1. *p.* 335. *n.* 13. *Müll. zool. dan. prodr.* 2355." and "*Stroem sundm.* 118. *t.* 1. *f.* 12. 13. Pulex cancriformis."

The genus *Oniscus* contains the Amphipod, *Oniscus veli*, 6. with references to Linnæus, Fabricius, Degeer, Martens, Seba, Pallas, Egede, and the remark, "*Habitat in* Oceano *boreali, balænis molestus, an hujus generis?*" p. 3011. It contains also Lepechin's two Amphipod species, *Oniscus aculeatus*, 26. p. 3013, and *Oniscus cuspidatus*, 28. p. 3014, and concludes with the following notices, of which the first, not being an Amphipod, is only here inserted for the sake of comparison with Turton's Linnæus :—

"fuscus. 32. O. fuscus, crusta carinata, macula thoracis alba. *Müll. zool. dan. prodr.* 2376. *Habitat in* Dania.

"Medusarum. 33. O. compressiusculus, fronte obtusa, antennis brevissimis nutantibus, manibus quatuor compresso-incisis. *Fabr. fn. groenl. p.* 257. *n.* 232. *Müll. prodr. zool. dan.* 2355.

"*Stroem sundm.* 1. *p.* 188. *t.* 1. *f.* 12. 13. Cancer medusarum.

"*Habitat sub* medullæ capillatæ *folimentis*, 10 *lineas longa.*

"Cicada. 34. O. compressus sublinearis, manibus quatuor spuriis, antennis summis brevioribus, caudæ dorso lævi. *O. Fabr. fn. groenl., p.* 258. *n.* 233. *Habitat in* mari Groenlandiam *alluente, potissimum ad ostia rivorum*, 5 *lineas longus.*

"arenarius. 35. O. anterius depressiusculus, posterius carinato-subserratus, pedibus quatuor anterioribus cheliformibus lævibus, antennis subæqualibus. *O. Fabr. fn. groenl. p.* 259. *n.* 234. *Müll. zool. dan. prodr.* 2358. *Stroem act. Hafn.* 10. *t.* 2. *f.* 1–8.

"*Habitat in* Groenlandiæ littoribus arenosis, *supra ulvam umbilicalem, cum* 2 *præcedentibus et* 3 *insequentibus cancris, præsertim pulici affinis.*

"Stroemianus. 36. O. compressus, pedibus quatuor anterioribus cheliformibus subdentatis, antennis summis brevissimis. *O. Fabr. fn. groenl. p.* 261. *n.* 235. *Müll. zool. dan. prodr.* 2357. *Stroem act. Hafn.* 6. *p.* 588. *t.* 8. *Habitat ad* Groenlandiæ *littora, violaceus.*

"abyssinus. 36. O. subcylindricus, pedibus quatuor anterioribus cheliformibus unidentatis, antennis subæqualibus setiferis margine baseos interiore serratis. *O. Fabr. fn. groenl. p.* 261, *n.* 236.

"*Habitat in* fundo maris Groenlandiam *alluentis, supra ulvas maximas, minimus, vix 4 lineas longus.*

"serratus. 38. O ventricosus supra carinato serratus, rostro corniformi deflexo, manibus duabus spuriis ; antennis summis longioribus. *O. Fabr. fn. groenl. p.* 262. *n.* 237.

"*Habitat in* profundis maris Groenlandiam alluentis, *ex albo croceoque fasciatus, egregie in aqua saltans, saepius pronus natans, pedes, antennas, caudamque sub abdomine condens.*"

In the foregoing list *Oniscus ceti*, as Lütken points out, is no longer confused with *Pycnogonum*. On the other hand *Cancer* "*medusarum*" and *Oniscus* "*Medusarum*" are curiously entangled. Although they are retained in different genera, the same references to Müller and Ström are given for both, except that in regard to Ström, by an obvious slip, "p. 118" appears in one reference and "p. 188" in the other. At the same time, to the second of these references the words "Cancer medusarum" are added, probably to warn the reader that if the last six species of *Oniscus*, præsertim pulici affines, should be transferred to the *Gammarus*-group, Oniscus Medusarum would then become one with Cancer medusarum. Bovallius now distinguishes them by calling the *Oniscus* in question "*Hyperia Kroeyeri*," while the *Cancer* is named *Hyperia medusarum*, O. F. Müller.

1789. Rœmer, Johann Jacob, born 1761, died 1819 (Hagen).

Genera Insectorum Linnæi et Fabricii iconibus illustrata a Johanne Jacobo Roemer. Vitoduri Helvetorum, MDCCLXXXIX.

In the Systema Linnæi here given the Aptera are on pages 32–36, not including any Amphipoda. In the Systema Fabricii, the Agonata, pages 61–63, include "137, Gammarus, *antenna* quatuor simplicissimæ pedunculatæ: *anticæ* breves subulatæ: *posticæ* setaceæ. *Longicornis*, Fabr. Sp. Ins. I. p. 516, n. 4. Manibus adactylis, antennis corpore longioribus, cauda obtusa. Tab. xxxiii. f. 6. Habitat in Europæ oceano." This is *Corophium volutator*, Pall. The Antliata, pages 82–86, include "193, Pycnogonum, *Haustellum* tubulosum, conicum, absque setis, *Palpi duo* ad basin haustelli. *Balænarum*, Fabr. S. Ent. 810, 35. Sp. Ins. II. p. 475, n. 1. *Phalangium* Linn. *Pediculus* Fabr, in Syst. Palpis duobus, corpore ovato. Tab. xxxvi. f. 17. Habitat in Oceano Norwagico." The figure is obviously borrowed from Brünnich, although that author is not mentioned. In the figures of *Cyamus* by Martens, Egede and Adelung, the head is represented pointing downwards, as though the artists did not know which was the head and which was the tail, since the general rule in older, as well as in recent, times is to give vertical figures with the heads uppermost. Brünnich figures his *Pycnogonum* head downwards, perhaps for purposes of comparison with the old figures of *Cyamus*, since he at any rate well knew the structure of the creature he was drawing.

1789. Müller, Otho Fridericus. Abildgaard, Peter Christian, born about 1740, died 1808 (Nouvelle Biographie générale).

Zoologia Danica seu Animalium Daniæ et Norvegiæ rariorum ac minus notorum Descriptiones et Historia. *Volumen tertium* explicationi iconum fasciculi tertii ejusdem operis inserviens. Auctore Othone Friderico Müller. Descripsit et Tabulas addidit Petrus Christianus Abildgaard. Havniæ, MDCCLXXXIX.

He figures, pl. ci., and on pp. 33–34 describes, *Gammarus pedatus*, "Gammarus linearis corpore articulis sex, pedibus quatuordecim unguiculatis ultimis quatuor longioribus, cauda nulla

distincta," referring to "*Squilla* acaudata pedibus quatuordecim Gronovius *in Actis Helv.* 4, p. 39, t. 4, figs. 8, 9?" and "Cancer *linearis*, Linn. *Syst. nat. p.* 1056, *n.* 83?" To the fuller description he appends the observation, "Ad genus Gammarorum Celeb. J. C. Fabricii hoc insectum refero, quia primus certis caracteribus canerorum familiam ab oniscis distinxit; proprium tamen genus cum Squilla quadrilobata et ventricosa Müllerı, quibus cauda nulla et pedes omnes unguiculati constitueri videtur." It is now recognised as *Proto ventricosa*, O. F. M. On pl. cxiv., figs. 11, 12, and p. 58, he figures and describes *Gammarus quadrilobatus* ♀, with references to "Squilla lobata, Zool. Dan. prodr. n. 2359." "Fabricii Faun. Groenl. n. 225." "Squilla quadrilobata, Zool. Dan. fasc. 2, p. 21, tab. 56, fig. 4–6." On pl. cxvi, figs. 1–6, and p. 59, *Gammarus podurus* is given, considered by Milne-Edwards to be an *Amphithoë*, by Spence Bate a *Pherusa*, by Boeck with more probability an undoubted *Gammarus*. It has a red spot on each of the seventh, eighth, ninth, and tenth segments. Dorsal spines are shown on the penultimate and antepenultimate segments. *Gammarus mutilus*, figured on pl. cxvi., figs. 1–11, described on p. 60, in Boeck's opinion is like but not the same as *Gammarus locusta*. Milne-Edwards compares it with his *Gammarus savii* (called *Mœra savii* by Spence Bate), but thinks it distinguished by the long accessory flagellum, the narrow first joint of the hind legs, and the large rami of the last uropods. He says, Hist. des Crust., iii. 53 n., "La première figure représentant cette crevette de grandeur naturelle est très-mauvaise, et a éte reproduite dans l'Encyclopédie, Pl. 336, fig. 43; mais les autres, qui peuvent réellement être très-utiles pour la détermination de l'espèce, n'ont pas été données dans cet ouvrage." The name *mutilus* is itself not very easy to understand. It agrees, indeed, very well with the fig. 1 which Milne-Edwards censures, for in that the animal abruptly ends with the third pleon-segment. It might have been suggested that the other three segments were accidently missing, but that Abildgaard has carefully figured the first, second, and third uropods. In the enlarged figure of the antennæ, the flagella of the upper and lower are drawn as equal in length, and the accessory flagellum has about four and twenty joints. If this figure can be trusted, it should be of essential service for determining this still doubtful species. There are dorsal spines or teeth on the hind margins of the last segment of the pereion and the first three of the pleon, which constitute an additional mark of distinction between this species and *Mœra savii*. *Gammarus spinicarpus*, pl. cxix., figs. 1–4, pp. 66–67, is known now as *Leucothoë spinicarpa*. *Oniscus ceti*, pl. cxix., figs. 13–17, pp. 69–70, with references to numerous authors and the synonyms "*Oniscus Ceti*, Linn.," "Pediculus Ceti, Martens," "Squilla Balænæ, Degeer," corresponds with *Cyamus nodosus*, Ltk., according to Lütken, the synonymy being erroneous.

1791. Olivier, Antoine Guillaume, born 1756, died 1814 (Hagen).

Histoire Naturelle. Insectes. Par M. Olivier. Tome sixieme. A Paris, M.DCC.XCI. Encyclopédie méthodique, ou par ordre de matières; par une société de gens de lettres, de savans et d'artistes.

The article Crevette extends from page 182 to page 190. The genus is thus defined:—"Crevette. Gammarus, *Fab.* Cancer. *Lin. Geoff.* *Squilla*, Deg. Caractères génériques. Quatre antennes setacées, plus courtes que le corps; les deux inférieures plus longues que les deux supérieures. Bouche formée d'une lèvre supérieure, de deux mandibules, de deux mâchoires divisées, d'une lèvre inférieure très-avancée, et de huit antennules courtes. Yeux immobiles, point du tout saillans. Pattes ordinairement au nombre de quatorze."

After describing the upper lip and mandibles he says, p. 182, "les pièces qui se trouvent au dessous, et que M. Fabricius a pris pour une lèvre inférieure, me paroissent devoir être

regardées comme des mâchoires. Elles sont au nombre de six, trois de chaque côté. Elles sont larges, applaties, un peu ciliées à leur extrémité interne.

"La lévre inférieure qui se trouve en-dessous, est longue, recourbée, et couvre presque toute la bouche. Elle est membraneuse, échancrée, et terminée par deux petites antennules.

"Les antennules sont au nombre de huit; elles sont courtes, presque setacées, et composées de trois ou quatre articles peu distincts. Les deux antérieures sont insérées au dos des mandibules. Les quatre qui suivent, ont leur attache au dos des mâchoires, et les deux dernières sont placées à l'extrémité de la lèvre inférieure."

The species are given as follows:—"1. Crevette ampoule, *Gammarus ampulla;* 2. C. folâtre, *G. nugax;* 3. C. cancelle, *G. cancellus;* 4. C. longicorne, *G. longicornis;* 5. C. sauteuse, *G. locusta;* 6. C. gammarelle, *G. gammarellus;* 7. C. des ruisseaux, *G. pulex;* 8. C. cornue, *G. corniger;* 9. C. linéaire, *G. linearis;* 10. C. saline, *G. salinus;* 11. C. filiforme, *G. filiformis;* 12. C. marécageuse, *G. stagnalis;* 13. C. bossue, *G. gibbosus;* 14. C. appât, *G. esca;* 15. C. des méduses, *G. medusarum;*" all of which have been already discussed.

Some of the subsidiary observations show that the author was not fully aware of the distinction between the Orchestidæ and the Gammaridæ, nor is any special criticism exercised upon the synonymy. Faxon, Bibl. Embryol. 1882, calls attention to his "observations on young *Gammarus*, p. 183."

1791. Wulfen, Franz Xavier L. Baron von, died 1805 (Hagen).

Dn. FRANCISCI XAVERII L. B. DE WULFEN *Descriptiones Zoologicæ Ad Adriatici littora maris concinnatæ.* Nova acta physico-medica Academiæ Cæsareæ Leopoldino-carolinæ naturæ curiosorum exhibentia Ephemerides sive observationes historias et experimenta a celeberrimis Germaniæ et exterarum regionum Viris habita et communicata singulari studio collecta. Tomus Octavus. Norimbergæ, Anno MDCCLXCI. ("Præfatio" dated XXII. Jul. MDCCLXXXXI.). pp. 235–359.

From the subjoined account of "*Cancer Pulex*," it would seem that this author has carried to the highest point the confusion of species under this title, which to his apprehension probably included almost all the Gammarina. At page 312, he gives:—

"52. *Cancer Pulex.*

"Cancer macrourus incurvus articularis compressus; pedibus quatuordecim; anticis duorum parium subcheliformibus, retractili-uncinatis; stylis caudæ bifurcis trium parium.

"Cancer macrourus articularis, manibus quatuor adactylis, pedibus decem. *Linn.* Syst. N. T. I. P. 2. p. 1055. N. 81. *Rösel*, Ins. 3. Supl. Tab. 62. *Baster.* Subs. II. p. 31. Tab. 3. fig. 7. *Geofr.* Ins. II. p. 667. N. 2. Tab. 21. fig. 6. *Frisch.* Ins. T. 7. p. 26. Tab. 18. fig. 1. *Scopol.* Ent, N. 1137.

"Squilla Pulex. *De Geer.* Ins. 7. p. 193. N. 4. Tab. 33.

"Oniscus Pulex. *Fabric.* Faun. Groenl. p. 254. N. 231.

"Cancer Locusta. *Linn*, Syst. N. T. I. P. 2. p. 1055. N. 82. *Scopol.* Entom. p. 411. N. 1136.

"Vulgatissimus ad maris littora sub lapidibus; adhærens etiam passim Fucis Ulvis Spongiis. In dulcibus item fluviorum lacuum stagnorum aquis frequentissimus. Non differt Cancer Linnaei Scopoliique Locusta, ab eorumdem Cancro Pulice specifice. Magnitudine, colore, etc. variat admodum. Vidi aquose virentem, excolorem alias, et transparentem, nunc album, jam et aquose fuscescentem, subnigricantem interdum etiam; communiter aquose grisescit; exsiccatione plus minus flavens semper. Nunc non nisi tres quatuorve lineas est longus; alias octo, decemve, pollicaris reperitur etiam, ac cum proportione magis, minusve corpulentus. Bini quoque extimi caudæ styli longiores quandoque, alias contra adeo parvi, ut vixdum liberis

videantur oculis, et duo tantum eorumdem paria, pro tribus, adesse credantur. Ex quo forsan præcipua Locustam inter et Pulicem desumpta fuerit diversitas? Corpus anomalo huic Cancro est oblongum, semitereti-compressum, lunato-incurvum, nudum, læve, nitens, semidiaphanum, articulare; constans capite absque thorace, tum suturis quatuordecim, utrinque ad latera deflexis; quarum anteriores, septem abdominis, longius tantisper utrinque procurrentes, marginibus lateralibus rotundatæ; posteriores septem caudæ, magis, magisque attenuatæ, caudam formant longiusculam, incurvam, apice acutiusculam, sursumque subrecurvam; dorso cæterum, longitudinaliter convexum seu teretiusculum est corpus, subtus concavo-canaliculatum. Caput inflexum, oblongum, declive, fronte longitudinaliter convexa, compressum, os versus obtusum, nec rostratum; oculis binis, oblongo-ovalibus, atris, nitentibus, ad summa capitis latera, inter superiores, et inferiores postice antennas, sitis. Antennæ duorum parium, seu quatuor, ex summo frontis vertice, antrorsum porrectæ et incurvæ, setaceæ, paribus approximatis; singulis quadriarticulatis; superiores longiores, tertiæ parti corporis subæquales; articulis tribus inferioribus crassioribus, teretibus, inæqualiter oblongis, ramulo laterali moniliformi-setaceo ad apicem appendiculatis; articulo extimo reliquis omnibus longiore moniliformi-setaceo, ciliis adsperso. Inferiores breviores, non nihil superioribus crassiores, iis cætera simillimæ, dempto ramulo laterali. Os inferum, maxillosodentatum. Palpi duo, os versus porrecti, articulati, apice uncinati. Pedes quatuordecim, utrinque septem, sub suturis abdominalibus, quorum quatuor antica paria antrorsum, tria vero postica, eaque longiora, retrorsum versa. Prima omnium duo paria brevissima, quadriarticulata, articulo extimo subcheliformi, tumidiusculo, ovato, extrorsum compresso, apice ungue hamato-uncinato retractili armato; binis insequentibus paribus sexarticulatis, articulis oblongis, inæqualibus, extimo in unguem subulatum abeunte. Tribus denique posticis paribus, et ipsis sexarticulatis, articulis oblongis, tereti-compressis, femoribus solis incrassatis, ovato-oblongis; ungue extimi subulato. Pedes omnes per latera ciliati. Suturæ tres caudæ anteriores singulæ subtus pari pinnularum pediformium, teretium, semibifidarum, brevium instructæ; extimæ contra itidem tres, et ipsæ quoque ad lateralem utrinque marginem pinnula pediformi natatoria terete bifurca longiuscula retrorsum versa, et velut adscendente, ciliisque adspersa, instructæ."

The above carefully detailed account probably refers to *Gammarus pulex* alone, without taking any notice of the other Amphipoda, differing in colour, size, and shape of tail which Wulfen supposed to be merely varieties of it. The Crustacean which he next describes, he calls "*Cancer Locusta*," the largest of all the Caneri he had ever seen, and a specimen of which had cost him two florins in the market of Trieste. He thought Linnæus unlucky in having attributed the name *Locusta* "non tam peculiari Caneri alicujus speciei, quam exiguæ verius Caneri Pulicis varietati."

1792. Olivi, Giuseppe, born 1769, died 1795.

Zoologia Adriatica ossia Catalogo ragionato degli Animali del Golfo e delle Lagune di Venezia; preceduto da una Dissertazione sulla Storia fisica e naturale del Golfo; e accompagnato da Memorie, ed Osservazioni di Fisica Storia naturale ed Economia. Bassano, MDCCXCII.

The Insecta Aptera of the genus *Cancer* are discussed on pages 41–61. Only two Amphipods are spoken of, one under the title *Cancer* "Locusta, *Linn. sp.* 82," the other *Cancer* "linearis, *Linn. sp.* 83." Of "C. Locusta" he says "this is the only species of *Gamberi* or *Squille* indigenous to the Terme Aponesi," and infers therefore that it must be the species inaccurately described and obscurely figured by Sig. Vandelli in the first of his

three dissertations "De Apon. Thermis Patav. 1758." G. D. Nardo, 1869, explains it by "Orchestia littorea," a designation which he also applies to the *Cancer locusta*, L., of Chiereghin, but the figure which he gives of that species shows that the doubts which he expresses about it are well founded, since it is certainly not an *Orchestia*. Olivi is not sure of the specific determination of the little marine animals which he had found akin to *Cancer linearis*, but he takes the opportunity of stigmatising the method of Linnæus as artificial, better suited to facilitate the knowledge of the student, than to show the progression of nature. Hence in the present instance he approves the separation of these insects from the other *Granchj*, either as was done by Pallas in a separate order of *Onischi cancriformi*, or as by more recent naturalists in a genus expressly instituted, which he thinks still more convenient.

1793. Fabricius, J. C.

Entomologia Systematica emendata et aucta. Secundum Classes, Ordines, Genera, Species adjectis synonimis, locis, observationibus, descriptionibus. Tom. II. Hafniæ. MDCCXCIII.

The Agonata are here the eighth class, with eleven genera, *Limulus*, *Monoculus*, *Cymothoa*, *Cancer*, *Pagurus*, *Scyllarus*, *Hippa*, *Galathea*, *Astacus*, *Squilla*, *Gammarus*. *Gammarus* has fourteen species, *Gammarus carinatus* being now included, of which the present name is *Atylus carinatus*. The account of *Gammarus gibbosus* does not vary from that which Fabricius gave of the same species in 1775, under the name *Oniscus gibbosus*. It belongs to the Hyperina, possibly Boeck suggests, to *Amphipronoë*, Sp. Bate, a genus which Claus, 1879, though with much hesitation, supposes to be perhaps the same as his own *Parapronoë*. Opposed to Boeck's suggestion are the facts that in *Amphipronoë* and *Parapronoë* the peræon is not especially gibbous, its first segment is not very short, and the pleon has five distinct segments besides the telson, with which the fifth and sixth are not coalesced as in *Dithyrus* or *Hemityphis*. To *Cymothoa*, a new genus among the Agonata, Fabricius in this work refers "*Oniscus ceti*, Mant. Linn. p. 509." The genera *Oniscus*, *Scolopendra* and *Julus* form the class Mitosata. For "*Astacus Homari*" of this work, see notes on Herbst, "58," and on the Supplementum Ent. Syst. 1798.

1796. Herbst, Johann Friedrich Wilhelm, born 1743, died 1807 (Hagen).

Versuch einer Naturgeschichte der Krabben und Krebse nebst einer systematischen Beschreibung ihrer verschiedenen Arten. Zweyter Band mit xxv Kupfer-Tafeln und Register. Krebse. Berlin und Stralsund, 1796.

In this volume, pages 2, 3, Herbst quotes the definitions given by Fabricius in his Mantissa of *Cancer*, *Gammarus*, and the intermediate genera, and rejects them on the ground that they draw marks of distinction only from the antennæ. He himself makes six divisions of Crustacea (das ganze Krebsgeschlecht), the sixth of these divisions being the *Garneelasseln*, with the definition "diese haben mehr als acht Füsse, und oft gar keine Scheeren."

On page 105 the Garneelasseln are also called "Onisci gammarelli," the name given by Pallas. Of these he forms two families, the first "mit ungetheiltem Brustschilde" containing no Amphipods, unless, as seems most probable, *Amathilla sabini*, Leach, be in reality the

subject of No. 58, which Herbst, combining scraps of information after his usual method, thus describes :—

"58. Der Hummeraat. Cancer (Gammarellus) *homari.*

"*Fabric. Spec. Ins.* 511. 7. Astac. antennis posticis bifidis, corporis segmentis dorso subspinosis, cauda fasciculata, stylis serratis. It. *Norweg. Mant. 1. 332. 9. Fig, 1–8.*

"*Ström Acta Hafn. 10. pag. 5. Tab. 2.* Cancer dorso carinato serrato.

"*Müller Zool. Dan. 197. 2358.* C. macrourus articularis, dorso carinato serrato, spinis caudæ bifidis.

"*Grönl. Arkegiansoak.*

"Bey diesem Krebse haben die Abschnitte des Schwanzes auf dem Rücken einige schwache Dornen, auch ist er kielförmig erhöhet; Am Ende stehen Büschel und gespaltene Dornen. Die hintern Fühlhörner sind doppelt. Man findet ihn im Norwegischen Meere." In this passage, "Fig. 1–8," attributed to the Mantissa of Fabricius, no doubt properly belongs to the next reference, as given where that reference is repeated under "Cancer (Gammarellus) *arenarius.*"

The second family of Garneelasseln "haben einen aus mehreren Gliedern bestehenden Brustschild, gröstentheils festsitzende Augen und 7 Paar Füsse." These appear in the Table of Contents as "Zweyte Familie, mit gegliedertem Rückenschilde," the generic name *Cancer* being in that table applied to all the species not only of this but of all the other divisions. Pages 116–146 contain the "Garneelasseln mit getheiltem oder gegliedertem Rückenschilde," as follows :—

"61. Der Flaschenkrebs. Cancer (Gammarellus) *ampulla*," Phipps.

"62. Der Sonderling. Cancer (Gammarellus) *nugax*," Phipps.

"63. Der Pfützenkrebs. Cancer (Gammarellus) *paludosus*," O. Müller; not an Amphipod.

"64. Der Poduruskrebs. Cancer (Gammarellus) *podurus*," Müller. See Abildgaard, 1789.

"65. Der Verstümmelte. Cancer (Gammarellus) *mutilus*," Müller. See Abildgaard, 1789.

"66. Der Sumpfkrebs. Cancer (Gammarellus) *stagnalis*," *Linn. Syst. Nat.* 87; not an Amphipod

"67. Der Dickfuss. Cancer (Gammarellus) *grossipes*," with references "to *Lin. Syst. Nat. 80.* Astac. muticus," &c.; "*Fabric. Spec. Ins. 516. 4. Gammar. longicornis. Iter Norweg. 258.*" *Mantiss. I. 334. n. 4.*" "*Gronov. Zooph. 989. tab. 17. fig. 7.*" "*Pallas Spicileg. Zool. Fasc. 9. 59. tab. 4 fig. 9.* Onisens volutator;" "*Pantopp. It. T. 2 p. 334*, Räger, Hopper.;" and "*Fabric. Gen. Ins. Append. Gammarus crassipes.*" *Pantopp.* is for Pontoppidan.

"68. Das Krebschen. Cancer (Gammarellus) *cancellus*," with the references "*Fabric. Spec. Ins. 516. 3.* Gammar. manibus quatuor monodactylis, pedibus sedecim. *Mant. I. 334. n. 3*," and "*Pallas Spicileg. Zool. Fasc. 9. 53. tab. 3. fig. 15, Oniscus cancellus;* und in der deutschen Uebersetzung *Oniscus muricatus.*" Steller, he says, calls this Siberian fresh-water species "*Squilla fluviatilis* or *phryganea fluvii Angara.*" Dybowski, in 1874, mentions that the form from the river Angara differs from that out of Lake Baikal by having shorter upper antennæ and the lateral spines on the fifth segment of the trunk less developed.

"69. Die Heuschreckengarnäle. Cancer (Gammarellus) *locusta*," with references to "*Fabric. Spec. Ins. 516. 5*;" "*Mant. I. 334, 5*;" "*Pallas Spicileg. Zool. 9. 56. tab. 4. fig. 7*;" "*Gesner aquatil. 894.*" Upon this species he remarks: "This kind (Gattung) is *Bellon's, Mouffet's* and *Gesner's* sea-flea, in *Ray. hist. Ins. 43*, and is reckoned by *Linné* with the common water-flea (wasserfloh) of the German rivers among the Krebse. In Linnæus's Syst. Nat. he has attempted to distinguish the two kinds by the number of the feet, and to the species which he calls *locusta* he attributes, including the four gnathopods (Fangfüsse), eighteen feet, a number due probably to some mistake, and thus far not discovered to exist in any single related genus. Still more incorrect are the citations of authors under the same heading of *locusta;* for Rösel's figure T. 3 Tab. 62, here cited, obviously represents C. pulex, as also

Frisch. 7. Tab. 18; indeed, in the twelfth edition Rösel's figure is actually referred to two species, to locusta and to pulex, and yet it can only represent one species; as also the figure referred to in Sulzer's Kennz. Tab. 23. Fig. 152. represents Rösel's C. pulex. Klein's bad description and figure in his Dub. circa Lin. class. quadr. et amphib. p. 36. tab. fig. δ. ε. ζ. might appear doubtful, but because in the Baltic (Ostsee) only *pulex* but not *locusta* is commonly noticed, Klein's figure will have to be referred to *pulex*, as well as that in *Klein hist. pisc. Miss. V. p. 9. tab. 4. A. B. C.* Consequently not one of Linnæus's references is left for *locusta;* he must therefore either have taken the larger Pulex-species occurring in the Baltic (in der See) for *Locusta*, or have intended a quite unknown *Locusta*. I therefore here describe under the name *Locusta* not Linnæus's, but the species found in Pallas Spicileg. Zool. Fasc. 9, and really distinct from *C. pulex;* of which no author makes mention unless it be *Ray. hist. ins. p. 44;* who distinguishes a sea-water flea from that in fresh water, and refers to a figure in *Dadonæus pemptad. p. 4, 76.*" The species here discussed is now known as *Talitrus locusta*, Pallas. Ray's Dadonæus should be Dodonæus, *i.e.*, Rembert Dodoens.

"70. Die Gammarelle. Cancer *gammarellus*," with references to Pallas, Gronovius, Baster, and Scopoli. This is the *Oniscus gammarellus* of Pallas, now known as *Orchestia gammarellus*. Herbst gives Pallas the credit of having distinguished it from *Cancer pulex*, and it will be noticed that he omits the generic (Gammarellus), perhaps not knowing exactly what to do with a generic name the same as the specific.

"71. Der Seefloh. Cancer (Gammarellus) *pulex*," with references to fifteen authors and eighteen different works, beginning with "*Lin. Syst. Nat. 81*," and ending with "*Scopol. Ent. Carn. 1137.*" He ends his description by saying, "whether the *Cancer pulex* of *Linné* be the same as *C. pulex* of *Scopoli*. may rightly be doubted, since the latter lives always in fresh water." Herbst borrows his figure from Rösel, but neither makes his description tally with the figure, nor takes notice of the differences.

"72. Die Sandgarneele. Cancer (Gammarellus) *arenarius*." with references to "*Ott. Fabric. Fauna Grönl. 259. n. 234*," and "*Acta Hafn. X. 5 tab. 2. fig. 1–8*," which is perhaps *Amathilla homari*, J. C. Fabr.

"73. Das Dickhorn. Cancer (Gammarellus) *crassicornis. Fabric. Syst. Ent. 415. 7. Spec. Ins. 511. 9.* Ast. antennis posticis bifidis, thorace articulato, pedibus sexti paris longissimis. *Mant. 1. 332. 11. Mus. Banks.*" This is, apparently, not an Amphipod, unless it be one of the Hyperina in disguise.

"74. Die Strömische Garneelassel. Cancer (Gammarellus) *strömianus. Ott. Fabric. Fauna Grönl. 261. n. 235.*

"75. Die Dornhand. Cancer (Gammarellus) *spinicarpus*, with a reference to "*O. Müller Zool. Dan. p. 66. tab. 119. fig. 1–4. Gammarus* brachiis quatuor chelatis, in spinam productis," this being the *Gammarus spinicarpus* of Abildgaard in the third volume of the Zool. Dan.

"76. Der Mönch. Cancer (Gammarellus) *sedentarius*, Forskäl.

"77. Die Cicadengarneele. Cancer (Gammarellus) *cicada. Ott. Fabric. Faun. Grönl. 258. n. 233.*

"78. Der Sägerücken. Cancer (Gammarellus) *serratus. Ott. Fabric. Faun. Grönl. 262. n. 237.*

"79. Die Medusenassel. Cancer (Gammarellus) *medusarum*," with references to J. C. Fabricius Ström, O. F. Müller, Otto Fabricius, and Bomare, v. 235. He here therefore combines the species now named respectively *Hyperia medusarum*, O. F. Müller, and *Hyperia kroeyeri*, Bovallius.

"80. Der Hornträger. Cancer (Gammarellus) *corniger*, *Fabric. Spec. Ins. 517. 7.*

"81. Der Abyssiner. Cancer (Gammarellus) *abyssinus. Ott. Fabric. Fauna Grönl. 261. n. 236.*

"82. Der Fadenkrebs. Cancer (Gammarellus) *linearis*," with references to the species *linearis*

and *atomos* in *Linn. Syst. Nat. n.* 83. *n.* 84; Gammar. *linearis* of J. C. Fabricius; *atomos* of Pennant; Squilla lobata, *Müller prodrom.* 2359; *Ott. Fabric. Faun. Grönl.* 248. *n.* 225; *Oniscus scolopendroides* of Pallas; *Martin Spizberg. tab. B. fig. I. p.* 115. Granat.; *Baster opusc. subsec.*; and "*Müller Zool. Dan. p. 21. tab. LVI. Squilla* quadrilobata mas, gammarus quadrilobatus, *tab. CXIV.* foem. anteced." It is in all probability the *Caprella linearis* (Linn.) Bate, the figure 9. A, agreeing very fairly with that of *Caprella lobata* in the Brit. Sess. Crust., vol. ii. p. 57.

"83. Der Bauchichte. Cancer (Gammarellus) *ventricosus*," O. F. Müller.

The section or family concludes with three species which are not Amphipoda.

"84. Die Salzgarneele. Cancer (oniscus) *salinus*.

"85. Die Cylinderassel. Cancer (oniscus) *cylindricus*.

"86. Der Heringfreund. Cancer (oniscus) *esca*."

Figures are given on pls. xxxv. and xxxvi., from various sources, for all the species except those numbered 72, 73, 74, 77, 78, 79, 80, 81, and the last three."

Herbst's work is spoken of with great commendation by Milne-Edwards, but it must be confessed that, however great its merits may be in regard to Crustacea in general, on the Amphipoda this compilation throws but little light.

1796. Latreille, Pierre André, born 1762, died 1833 (Hagen).

Précis des Caractères génériques des insectes, disposés dans un ordre naturel. Par le Citoyen Latreille. A Paris, et à Brive, an 5 de la R.

In the preface Latreille defines the word *insecte*: "*Animal sans vertebres, dont le corps et les pattes sont de plusieurs pièces.*" The work opens with a Tabular "Division génerale des insectes," showing fourteen classes, the first seven belonging to the Ailés, the remaining seven to the Aptères. Classe xii. is formed by the "Entomostraca, Mull.," corresponding to "*Synistates, Agonates*, Fab." Classe xiii., containing "Crustacés, Crustacea. *Agonates*, Fab.," is defined:—"Tête confondue avec le corps renfermé ordinairement sous une caparace. Antennes. (*Quatre*)

"Plusieurs rangs de feuillets maxillaires et d'antennules, dont deux insérées et couchées sur les mandibules. Lévre inférieure. o.

"Dix pattes communément."

Classe xiv. containing "Myriapodes, Myriapoda. *Synistates, mitosates, Unogates*, Fab.," is defined:—"Tête distinguée du corps, antennifère.

"Mandibules ayant un avancement conique à leur base; des dents écailleuses implantées sur le contour de l'extrémité.

"Deux rangs de mâchoires au plus. Une lèvre inférieure. Quatorze pattes et plus."

On pages 193–201 the genera of the two last classes are given. Under "Crustacés. (*Cancer* Linn. Geoff.)," are given *Cancer, Pagurus, Scyllarus, Hippa, Galathea, Astacus, Squilla, Gammarus, Carcinus, Entomon.* Of these the eighth and ninth are thus described:—

"CREVETTE. Gammarus, Fab. Oliv., *Squilla*, Fab.

"Antennes pédonculées, très-simples; antérieures courtes, subulées; postérieures sétacées. Antennules bifides. Feuillets maxillaires extérieurs ayant plus de divisions que les intérieurs.

"C. II. [Caractères habituels.] Corps petit, alongé, comprimé, glabre, agile, de plusieurs segmens. Tête distinguée du corcelet; yeux souvent petits, arrondis et sessiles. Antennes rapprochées, insérées dans l'entre-deux. Pattes de dix à seize; antérieures quelquefois en pince ou en faux. Queue terminée par plusieurs pointes ou styles.

"*CARCIN. Carcinus. *Gammarus*, Fab. Oliv.

"Antennes pédonculées très-simples, sétacées; anterieures plus longues. Antennules entières. Toutes les pièces maxillaires bifides.

"C. H. Corps alongé, comprimé, arqué. Tête distincte; yeux sessiles, immobiles. Dix pattes comprimées; les premières et les dernières plus longues. Derniers anneaux ayant chacun un appendice bifide articulé. Queue terminée par deux appendices presque semblables, plus longs, et une petite pièce conique, ciliée de chaque côté,"

In the Myriapodes the genera are *Asellus, Cyamus, Oniscus, Julus, Scolopendra.* The second of these is thus described:—

"*CYAME. Cyamus. *Oniscus*, Linn. Fab. *Squilla*, Gée.

"Quatre antennes très-courtes; antérieures coniques, de quatre articles, dont le dernier fort court; postérieures insérées inférieurement, plus courtes que la tête, de trois articles. Antennules obsolètes.

"C. H. Corps ovale, déprimé, crustacé. Tête distinte. Six anneaux. Quatorze pattes; les deux premières plus petites, insérées sous la tête; les 1, 2, 5, 6, et 7e paires terminées par un crochet."

The genera called in French *Carcin, Entomon,* and *Cyame* are marked each with an asterisk to show that they are new, instituted by Latreille himself. The first two have not maintained their ground against earlier designations.

1797. Anonymous.

Epitome Entomologiæ Fabricianæ sive Nomenclator Entomologicus emendatus sistens Fabriciani systematis cum Linneano comparationem adjectis characteribus ordinum et generum, speciebus novis aliorum entomologorum, insectorum habitationibus, nominibus Germanorum Francogallorum Anglorum. Cum indicibus et Bibliotheca Fabriciana. Lipsiæ, 1797.

This work refers to another apparently of the same character, entitled "Nomenclator entomologicus secundum entomologiam systematicam ill. Fabricii. Conscriptus a Friderico Webero. Chilonii et Hamburgi. 1795." Among other derivations it gives, together with the definitions, for Synistata, "palpi quatuor maxilla connata cum labio. *Kieferlippen a συνίστημι,*" to unite; for Mitosata, "palpi duo, maxilla filiformis membranacea, *Fadenmäuler a μίτος,*" a thread; for Unogata, "palpi duo porrecti, maxilla cornea unguiculata, *Haakenmauler* ab *ὄνυξ,*" a nail; and for Agonata "palpi sæpius sex, maxilla omnino nulla. Kinnlose ab *ἀγόνατος,*" which properly means without a knee or without joints, but is here seemingly taken to mean without a jaw, as though from *γένειον* instead of *γόνυ.*

Among the Agonata are given *Astacus homari* on page 117, *Cymothoa ceti* on page 119, and on the same page a list of the species of *Gammarus* in accordance with the Ent. Syst. emend. et auct., of 1793. In another list, among the "Agonata sec. Daldorfium," on page 125, "G. Homari (Ast. F.)" is added to the previous catalogue of Gammari.

1797. Cuvier, Georges (alias Léopold-Chrétien-Frédéric-Dagobert), Baron, born 1769, died 1832 (Encycl. Brit. 9th Ed.).

Tableau élémentaire de l'histoire naturelle des animaux. Par G. Cuvier. A. Paris, an 6.

In the seventh book, which treats "des insectes et des vers," at page 450 Cuvier says, "*Swammerdam* divise les insectes d'après la métamorphose; *Linnæus*, d'après la présence

ou l'absence des ailes, leur nombre, et leurs tégumens; *Fabricius*, uniquement d'après leurs organes de la mastication ou de la déglutition. Nous adopterons une méthode combinée d'après ces trois points de vue, de manière à faire connoître les classes établies par ces trois auteurs, et nous les subdiviserons jusqu'à ce que les réunions de genres nous paroissent entièrement naturelles." This notice is followed by a chapter headed "Des insectes pourvus de mâchoires, et sans ailes." In this order he includes—"A. *Les crustacés, qui ont plusieurs paires de mâchoires.* (*AGONATA*, Fabr.)." "B. *Les MILLEPIEDS, qui ont le corps composé de beaucoup de segmens, portant des pieds, mais qui n'ont pas plusieurs mâchoires.* (*Mitosata*, Fabr.)." "C. *Les ARACNÉIDES: une seule pièce pour la tête et le corselet, portant huit pieds; l'abdomen sans pieds.* (*UNOGATA*, Fabr.)." "D. *Les PHTYRÉIDES: à tête distincte; corselet portant six pieds; abdomen sans pieds.*" Section A. comprises—"I. *LES MONOCLES.* (*Monoculus*)." "II. *LES ECREVISSES.* (*Cancer*)." "III. *LES CLOPORTES.* (*Oniscus*, Lin.)." These divisions are again divided and subdivided, but in none is any reference of any kind made to the Amphipoda, a curious omission on the part of an author on terms of intimacy, as he explains in his preface, both with Fabricius and Latreille. Among "*LES ECREVISSES proprement dites.* (*ASTACUS*, Fabr.)," are included "*Le homar.* (*Cancer gammarus*, Lin.)" and "*La crevette* ou *salicoque.* (*C. squilla*, Lin.)," two stalk-eyed Crustacea, in describing which, the names *gammarus* and *crevette* might naturally have called Cuvier's attention to the sessile-eyed legion, especially as in regard to the insects he says that Fabricius has helped him with the mouth-organs, "et, en général, il a bien voulu parcourir toute cette portion de l'ouvrage, et m'aider de ses conseils."

1798. FABRICIUS, J. C.

Supplementum Entomologiæ Systematicæ. Hafniæ, MDCCXCVIII.

In the preface Fabricius says "Agonatorum classem imprimis et nomine et charactere e speciminibus bene conservatis ab amicissimo Daldorffio ex India orientali allatis mutavi, divisi et classes magis naturales characteresque firmiores obtinui." He is here referring to Baron Dagobert Carl de Daldorff.

The Agonata no longer appear, but in their place Classis VIII. Polygonata, "*maxillæ* plures intra labium," containing *Oniscus*, *Ligia*, *Idotea*, *Cymothoa*, and *Monoculus;* Classis IX. Kleistagnatha, "*Maxillæ* plures extra labium os claudentes," the genera beginning with *Cancer* and ending with *Limulus;* Classis X. Exochnata, "*Maxillæ* plures extra labium tectæ palpis," the genera included being *Albunea*, *Scyllarus*, *Palinurus*, *Palæmon*, *Alpheus*, *Astacus*, *Penæus*, *Crangon*, *Pagurus*, *Galathea*, *Squilla*, *Posydon*, *Gammarus*. The old definition of *Gammarus* is given, based only on the antennæ; and a single species, "*Gammarus Homari*," is thus described:—"15. Corporis segmentis dorso subspinosis, cauda fasciculata: stylis serratis. *Astacus Homari* Ent. Syst. 2. 481. 10. Stroem. Act. Hafn. 10. 5. tab. 2. Myll. Zool. Dom. 197. 2358. Habitat in Oceano Norwegico. Antennæ simplices haud bifidæ." These references to Ström and Müller's Zool. Dan. prodr., as earlier notices have stated, are probably concerned with *Amathilla Sabini*, Leach, while "*Astacus Homari*," Fabr., has apparently nowhere found admittance into the ranks of the Amphipoda. Milne-Edwards and Spence Bate do not include it in their lists, Boeck definitely, de Skand. og Arkt. Amph., p. 38, rejects it from his. But from the fact that Fabricius here singles it out as an example of the genus *Gammarus*, it is not unreasonable to suppose that he had changed his mind about its systematic position, especially as we find him adding the remark, "antennæ simplices haud bifidæ," as though to correct an error in his previous description, which contains the expression, "antennis posticis bifidis." By *antennis posticis* Fabricius apparently means the *upper* antennæ, not, as might more naturally be supposed,

the lower. *Amathilla sabini*, it is true, has an accessory flagellum on the *upper* antennæ, but of that feature Fabricius took no notice in his definition of the genus *Gammarus*.

On page 570, in Classis XIII. Antliata, "Os haustello inarticulato," the genus *Pycnogonum* is given and defined as having "*Haustellum* tubulosum, conicum absque setis. *Palpi* ad basin haustelli." The only species mentioned is *Pycnogonum ceti*, with *Cymothoa ceti*, Ent. Syst., and *Oniscus ceti*, Linn., as its synonyms. In the Systema Antliatorum, 1805, *Pycnogonum* no longer appears.

1799. Ödmann, Samuel (*alias* Ödman).

De Cancro Pulice, Linn. *Gammaro*, Fabr. (Svet. Grundmårgla.) et noxa, quam retibus piscatorum infert, experimenta olim instituta communicat Samuel Ödmann. Nova Acta regiæ Societatis Scientiarum Vpsaliensis. Vpsaliæ, MDCCXCIX.

On the much disputed question whether the Crustacean in question does or does not injure fishing nets Ödmann pronounces most decidedly that it does, on the ground of repeated experiments. With equal decision he denies that it attacks live fish. "Ipsos autem a piscibus minoribus copiose deglutiri, in culina dicitur quotidie. Præ primis vero *generi anatino* sapidas exhibent dapes." He says that at the beginning of November they come in from the deeper sea to the sheltered parts of the shore in incredible numbers, and that it is from then till May that their destructive industry chiefly needs guarding against by steeping the nets in a decoction from the bark of the alder (*Betula Alnus*). In January and February he repeatedly saw the *Sturnus Cinclus* spend the morning hours, from 7 to 10, in catching these *Cancri Pulices* before his windows in the island of Ingarö.

1799–1800. Cuvier and Duméril.

Leçons d'anatomie comparée, tom i. Paris, An viii.

The tableau septième of this work, as quoted by Desmarest, Cons. gén., 1825, shows "Crustacés. Classe VIIe. Animaux invertébrés, ayant des vaisseaux sanguins, une moelle épinière noueuse, et des membres articulés," including "1. Monocles. *Limulus*, *Caligus*, *Apus*, *Cyclops*, *Polyphemus*. 2. Ecrevisses. *Cancer*, *Inachus*, *Pagurus*, *Astacus*, *Palinurus*, *Scyllarus*, *Squilla*." These are followed by "Insectes. Classe VIIIe. Animaux invertébrés, dépourvus de vaisseaux sanguins, ayant une moelle épinière noueuse, et des membres articulés," of which section A are provided with "mâchoires." Of these a subsection are "sans ailes," one division of which are "Gnathaptères. Plusieurs paires de mâchoires," containing the "Polygnathes. *Asellus* ou *Physodes*, *Oniscus*, *Cymothoa*."

On this classification Milne-Edwards, Hist. nat. des Crust., i. p. 207, observes that the progress of science has withdrawn the Polygnathes from the Insecta, and has necessitated the employment of additional characters to distinguish the Crustacea from the Arachnida, which also have blood-vessels.

1801. Pallas, P. S.

Bemerkungen auf einer Reise in die südlichen statthalterschaften des Russischen Reichs in der Jahren 1793 und 1794. Zweyter Band. Leipzig, 1801.

Of Crustacea in the Crimea he says, page 475, "in den Flüssen endlich häufige *Krebse* von gutem Geschmacke, und in der See zwey Arten von *Taschenkrebsen*, deren die eine im

Sommer bey Nacht zur Begattung auf den Strand heraus kommt und bey Fackeln mit Handen gefangen wird, sonst aber zwischen den Felsen zu hausen pflegt; einige besondere *Asseln* so wohl auf dem Lande, als in der See, und einer kleinen bläulichen *Garnele* nicht zu erwähnen."

1801. Lamarck, Jean-Baptiste-Pierre Antoine Demonet, Chevalier de, born 1774, died 1829 (Hagen).

Système des Animaux sans vertébres, ou Tableau général des classes, des ordres et des genres de ces animaux; présentant leurs caractères essentiels et leur distribution, d'après la considération de leurs rapports naturels et de leur organisation, et suivant l'arrangement établi dans les galéries du Muséum d'Hist. Naturelle, parmi leurs dépouilles conservées; Précédé du discours d'ouverture du Cours de Zoologie, donné dans le Muséum National d'Histoire Naturelle l'an 8 de la République. A. Paris. An IX–1801.

Lamarck here divides invertebrate animals into seven classes, les mollusques, les crustacés, les arachnides, les insectes, les vers, les radières, les polypes. The Crustacea he divides into Crustacés pédiocles, forming two groups, and Crustacés sessiliocles, also with two groups. For the class at large he gives this description, "*Caract.* Le corps et les membres articulés. Peau crustacée que l'animal quitte et renouvelle à certaines époques. *Organ.* Un cerveau et des nerfs. Des branchies pour la respiration. Un cœur musculaire et des vaisseaux pour la circulation." "Ils engendrent plusieurs fois pendant leur vie." He considers that "les *balanites* et les *anatifs*" form the passage from the Mollusca to the Crustacea in a remarkable manner. The respiration by branchiæ instead of by stigmata and tracheæ, the muscular heart, and the capacity for repeated procreation strongly in his opinion distinguish the Crustacea from the Insecta.

He thus defines the Crustacés sessiliocles, his second order of Crustacea:—"Ils ont deux yeux distincts ou réunis en un seul, mais constamment fixes et sessiles." In this order the Première Section, pp. 164–168, is defined:—"Corps couvert de pièces crustacées nombreuses, soit transverses, soit longitudinales." It includes:—

"XXVe Genre. Crevette. *Gammarus.* Quatre antennes simples, inégales, sétacées, articulées, disposées sur deux rangs. Deux yeux distincts et sessiles. Corps alongé, couvert de pièces crustacées transverses. Des appendices bifides sur les côtés de la queue et á son extrémité. Des pattes articulées et onguiculées.

"**Gammarus pulex.* Fab. *Squilla pulex.* Degeer, ins. 7, p. 525, t. 33, f. 1, 2. C. *pulex.* Lin. Geoffr., ins. 2, p. 667, t. 21, f. 6. Herbst, t. 36, f. 4, 5. La crevette des ruisseaux."

"XXVIIe Genre. Chevrolle. *Caprella.* Quatre antennes inégales. Corps linéaire avec des renflemens irréguliers, articulé, à segmens plus longs que larges. Quene nulle ou très-courte et dépourvue d'écailles ou d'appendices quelconques. Pattes articulées, disposées par paires irrégulièrement distantes.

"**Caprella scolopendroïdes.* n. *Cancer linearis.* Lin. Bast. op. subsesc. 1, t. 4, f. 2. Pennant, Zool. Brit. 4, t. 12, f. 32. Herbst, p. 142, t. 36, f. 9, 10.

"**Caprella ventricosa.* n. *Squilla ventricosa.* Mull. Zool. Dan. p. 20, t. 56, f. 1–3. C. *Ventricosus,* Herbst, t. 36, f. 11, A, B."

"XXVIIIe Genre. Cyame. *Cyamus,* Lat. Quatre antennes inégales: les deux antérieures plus longues, sétacées. Un suçoir simple, rétractile, sortant d'une fente courte située sous la tête. Deux antennules insérées à la base de la bouche. Deux yeux. Corps ovale,

déprimé, à six segmens pédifères. Six paires de pattes; chaque patte terminée par un crochet.

"**Cyamus ceti*. n. *Squilla balænæ*. Degeer, ins. 7, p. 541, t. 42. f. 6, 7. Pall. Spic. Zool., 9, p. 76, t. 4, f. 14, A. B. C. *Oniscus ceti*, Lin. *Pycnogonum ceti*, Fab. Suppl. 570."

The remaining genera in this section, 26. *Asellus*, 29. *Ligia*, 30. *Oniscus*, 31. *Forbicina*, 32, *Cyclops*, are not Amphipoda.

1802. Bosc d'Antic, Louis Augustin Guillaume, born 1759, died 1828 (Hagen).

Histoire naturelle des Crustacés, contenant leur Description et leurs Mœurs. 2 vol. Paris. An X. (1802).

The first edition of this work has some historical interest, as being perhaps the first popular treatise ever written in the vernacular on Crustacea. The introduction remarks on the extreme and unjust neglect which had been shown by science to this branch of natural history. The author remarks that the Greek and Latin writers, as Aristotle, Athenæus, Hippocrates, and Pliny, had all considered the Malacostraca as fish, or intermediate between fish and shell-fish, that the earliest modern naturalists who had written upon them, such as Rondelet, Bélon, Gesner, Aldrovandus, Jonston, had placed them immediately after fish or Molluscs, that even the great Linnæus, who classed them with apterous insects, had left their genera and species in its primitive chaos, merely distinguishing *Crustacea brachyura* from *Crustacea macroura*, and leaving out of sight almost all the minute species. The improvements in classification introduced by Fabricius, Daldorf, Müller, Geoffroy, Cuvier, Lamarck and Latreille, are then explained. An account follows of the different organs of the mouth and the limbs, of the muscles as described by Cuvier, of the viscera after Roesel, of the renovation of limbs, and the phenomena of exuviation after Réaumur. In regard to the fierceness and size of Crustacea in warm countries there is a remark worth citing in the words of the original, "on dit qu'ils sont d'une grandeur si démesurée, qu'ils attaquent les hommes, et en ont mangé plusieurs, entre autres le fameux navigateur François Drack, qui, quoique armé, ne put éviter ce sort." Of this great sailor's death on the Isthmus of Darien, Hume says, "Drake himself, from the intemperance of the climate, the fatigues of his journey, and the vexation of his disappointment, was seized with a distemper, of which he soon after died." A rationalist would perhaps attempt to reconcile the two accounts by suggesting that Drake may have died of cancer.

Of Amphipods Bosc gives four genera, *Gammarus*, Fabr., *Talitrus*, Latr., *Caprella*, Lamarck, and *Cyamus*, Latr., with coloured figures of one species of each genus on pls. xiv., xv., and xvi. He describes one new species from North America, Talitre grillon, *Talitrus grillus*, with the reference "*voyez* pl. 15. et fig. 2." At the foot of pl. xv. we read, "1. 2. Thalitre terrestre." In accordance with the suggestion of Milne-Edwards, Spence Bate, in the Brit. Mus. Catal., names this *Orchestia gryllus*, with a synonym "*Scamballa Sayana*, Leach, MS."

Bate and Westwood, vol. i. p. 14, note that the name *Talitrus* first appears in the year 1802, both in Latreille's Hist. Gen. des Crust. et Ins., vol. iii., and in Bosc, vol. ii. the latter writer giving Latreille the credit of the invention, while Latreille subsequently, in 1806, refers the genus *Talitrus* to Bosc as its author. This may be explained by the fact which Bosc mentions, vol. i. p. 48, that Latreille had given him permission to use the classification of Crustacea which the lender had prepared for a new edition of his own work. Thus Latreille's *Talitrus* makes its first appearance in Bosc's treatise. It is defined as follows:— "Quatre antennes simples; les intermédiaires, supérieures, plus courtes que le pédoncule des inférieures. Corps alongé, couvert de pièces crustacées, transverses, presque égales, et appendiculées sur leurs côtés. Dix à quatorze pattes; les antérieures terminées par des mains. Des appendices bifides à l'extrémité du corps."

Under Crevette, *Gammarus*, Fabricius, Bosc gives the species *ampulla*, Phipps; *nugax*, Phipps; *carinatus*, author not named; *cancellus*, Pallas; *longicornis*, with references to Gronw., Pallas, Pennant, Herbst; *pulex*, Crevette des ruisseaux, defined as having "Quatre pinces sans doigts; dix pattes," with references to "*Buster*. Subs. 2. tab. 3. fig. 7. *Geoff.* Ins. 2. tab. 21. fig. 6. *Degeer*. Ins. 7. tab. 33. fig. 1, 2. *Herbst*. Canc. tab. 36. fig. 4, 5.," and to his own fig. 4 on pl. xiv., which is in fact a representation of Rösel's species; the account concluding with the remark "se trouve en Europe dans les eaux douces, elle est fort commune aux environs de Paris"; *corniger*, no author named; *gibbosus*, no author named; *esca*, no author named; *medusarum*, with reference only to *Strœm*, Sundm. tab. 1, figs. 12, 13, where the word "Sundm." is spelt as it is in Herbst's account of *medusarum*; and lastly *homari*, also with reference only to "*Strœm*, Act. Afr. 10. tab. 2."

Under Talitre, *Talitrus*, Latreille, Bosc gives *locusta*, with references to "*Pallas*, Spicil. Zool. 9. tab. 4. fig. 7. *Roesel*. Ins. 3. tab. 62. *Frisch*. Ins. 7. tab. 18. *Herbst*. Canc. tab. 36. fig. 1;" and *grillus*, his own species, figured pl. xv. fig. 2.

Under Chevrolle, *Caprella*, Lamarck, he gives *Caprella linearis*, "Quatre mains à un seul ongle; dix pieds dans le mâle," with references to "*Cancer linearis. Linn.—Gammarus linearis. Fab. Pallas*, Spicil. Zool. 9. tab. 4. fig. 15. *Pennant*. Zool. Brit. 3. tab. 12. fig. 32. *Martin*. Spitz. tab. P. fig. 1. *Herbst*. Canc. tab. 36. fig. 9 et 10, A. B.," his own figure, Pl. 15. fig. 5, being presumably borrowed from Herbst, who copies from the Zool. Dan. tab. 56. fig. 5; he also gives *Caprella ventricosa*. "Deux mains avec un seul ongle; quatorze pieds," with references to "*Muller*, Zool. Dan. tab. 56. fig. 1, 3. Acta Helv. 4. tab. 4. fig. 8, 9, 10." In his general remarks on "les chevrolles" he says, "La première espèce, qui a été observée par Muller, presente un phénomène remarquable; le mâle est fort différent, et a un plus grand nombre de pattes que la femelle." Bosc thinks that Müller must here have confounded two species. The confusion, however, must be laid to the charge of Bosc himself.

After chapters on *Asellus*, *Idotea*, *Sphæroma*, *Ligia*, *Caligus*, *Binoculus*, Bosc comes to Cyame, *Pygnogonum*, Fabricius, for which he borrows from Lamarck without acknowledgment the following definition:—"Quatre antennes inégales; les deux antérieures plus longues, setacées. Un suçoir simple, retractile, sortant d'une fente courte, située sous la tête. Deux antennules insérées à la base de la bouche. Deux yeux. Corps ovale, déprimé, à six segmens pédifères. Six paires de pattes; chaque patte terminée par un crochet." Lütken criticises the inapplicable expression *suçoir*, and is of opinion that by the two *antennules* at the base of the mouth, the first gnathopods, not the maxillipeds, must be understood here; he notices also the attribution of a *crochet* to each foot of six pairs. In the specific account Bosc clearly distinguishes the shape of what he supposed to be the third and fourth pairs of feet from that of the other five pairs. He speaks of the species as *le pou de baleine*, and figures it, pl. xvi. fig. 2, as le Cyame des Cétacés, representing, according to Lütken, a female (?) of *Cyamus mysticeti*. Bosc himself gives no Latin name either for this species, or for the *Pycnogonum* that has been confused with it. To the *Pycnogonum* he refers as "le cyame des baleines," and after finishing his account of "le cyame des cétacés," he says, "La seconde espèce avoit été placée par Linnaeus parmi les *phalangium;* par Pallas parmi les *acarus;* par Fabricius, d'abord parmi les poux, et en dernier lieu, avec la première, parmi les *pygnogonum*, sous le nom spécifique de *balenarum*. Brunick la regarde comme formant un genre nouveau, et probablement il a raison; car cet animal paroît bien différer par la description du pou de baleine."

1802. Schousboe, P. K. A.

Jagttagelser over tvende sieldne og lidet bekiendte Krebsarter. (Oplæst den 24 May 1799.) Skrivter af Naturhistorie-Selskabet. 5te Bind. 2det Hefte. Kiobenhavn, 1802.

The two Crustacea in question are here called *Dromia clypeata* and *Gammarus sedentarius*. The latter, Forskål's now well-known species, is fully described and fairly figured. Of it the author says, "In mari Tingidem alluente unica tantum vice plura specimina inveni mense Febr. 1793." He criticizes Herbst's rendering of Forskål's account, and his copy of Forskål's figure, as not quite accurate. He suggests that some unknown Mollusc may have been the first and original owner of the dwelling in which the creature is found.

1802. Turton, William.

A general system of Nature, etc., etc. Translated from Gmelin's last Edition of the celebrated Systema Naturæ, by Sir Charles Linné. Amended and enlarged by the improvements and discoveries of later naturalists and societies, *with appropriate Copper-plates*, by William Turton, M.D. Vol. iii. London, 1802.

Among the Insecta Aptera, following "118. Scorpio," comes "119. Cancer. *Legs*, 8 (rarely 6 or 0) besides 5 chelate hands or claws furnished with a moveable thumb: *feelers* 6, unequal: *eyes* 2, distant elongated moveable, and generally placed on peduncles: *mandibles* horny thick; *lip* triple; *tail* articulated and unarmed."

Under *Cancer*, Section "F. *Antennæ pedunculate and very simple.* Gammarus," contains the following information:—

"*Ampulla.* Hands without fangs: legs 14: hind-thighs compressed dilated.
Inhabits the *Northern Ocean. Phipps. tab.* 12. *fig.* 3.
Body nearly white; *proboscis* short incurved and very sharp: *tail* with 6 leaves, the last joint bifid.

"*Nugax.* Hands without fangs: legs 14: 6 hind-thighs compressed dilated.
Inhabits *North Seas. Phipps. tab.* 12. fig. 3.

"*Carino-spinosus.* Hands without fangs: legs 14; back carinate and spinous.
Inhabits ——— In the *British Museum.*
Body whitish subcompressed; the hind segments a little spinous.

"*Cancellus.* Hands 4 without fangs: legs 16.
Inhabits *Siberia. Pall. Spic. Zool.* 9. *tab.* 3. *fig.* 18.
First pair of antennæ incurved.

"* *Grossipes.* Hands without fangs: antennæ longer than the body: tail obtuse.
Inhabits *Europe. Brit. Zool.* iv. *tab.* 16. *fig.* 31.

"* *Locusta.* Hands 4 without fangs: legs 14: thighs simple: tail with bifid spines. *Roes. Ins.* 3. *tab.* 62. *Sulz. Ins. tab.* 23. *fig.* 152.
Inhabits *Europe* on sandy shores and in stagnant waters; leaps about with great agility.

"* *Pulex.* Hands 4 without fangs: legs 10.
Degeer. Ins. 7. *tab.* 33. *fig.* 1. 2. *Bast. tab.* 3. *fig.* 7.
Very common in fountains and rivulets, and swims in an incurved posture upon its back: is very troublesome to fish by getting between their gills, and is said to shine by night.

"*Corniger.* Hands without fangs: proboscis incurved subulate: sides of the thorax with a double horn.

Inhabits the *Norway Seas.*

Body of 11 short segments, whitish edged with red, the 5 hind ones carinate and spinous on the back: under the *thorax* each side are 2 horns united at the base: *tail* with numerous bifid styles.

"* *Linearis.* Hands 4 with a single fang: legs 10.

Pall. Spicil. Zool. 9. *tab.* 4. *fig.* 15, *Baster. tab.* 4. fig. 2.

Inhabits the shores of *Europe* and *America.*

"* *Atomos.* Hands 4 with a single fang: legs 14, with two oval vesicles each side between the fourth and fifth pair.

Pennant Brit. Zool. iv. *tab.* 12. *fig.* 22.

Inhabits *Europe*, in running water, and is so very minute as to be seldom visible to the naked eye.

"* *Salinus.* Legs 20 spreading: tail subulate," &c. (not an Amphipod).

"* *Stagnalis.* Hands without fangs: legs 22: tail cylindrical bifid," &c. (not an Amphipod).

"*Gibbosus.* Oblong, gibbous; antennæ folded and very long.

Inhabits *Portugal;* small.

Body smooth yellowish speckled with brown: *head* thick obtuse with a large green spot: *antennæ* bent under the body, folded and 3 times as long as the body: *tail* with 3 sharp cleft leaves.

"*Esca.* Hands without fangs: tail jointed subulate and cleft at the tip," &c. (not an Amphipod).

"*Medusarum.* Hands 4 with a single fang: head very obtuse.

Stroem, Sundm. 188. *tab.* 1. *fig.* 12, 13.

Inhabits *Norway*, under Medusæ.

"*Filiformis.* Linear; legs 10, the middle ones larger.

Inhabits *Melacca. Amoen. Acad.* 6. *p.* 415. *n.* 99."

After "120. Monoculus" comes "121. Oniscus. *Jaw* truncate denticulate: *lip* bifid: *antennæ* setaceous, 2–4: *body* oval, consisting of about 14 transverse segments: legs 14." Under section "A. *Feelers* 0: *antennæ often* 4, *sessile:* Cymothoa," are given among many others:—

"*Ceti.* Ovate with distinct segments: third and fourth pair of legs linear and unarmed.

Seba. Mus. 1. *tab.* 90. *fig.* 5. *Degeer.* 7. *t.* 42. *f.* 6, 7.

Inhabits the *Northern Seas*, on Whales."

"*Aculeatus.* Thorax naked: back with 3 rows of spines.

Act. Petrop. 1778, 1. *p.* 247. *tab.* 8. fig. 1.

Inhabits the *White Sea. Body* carmine."

"*Cuspidatus.* Thorax articulate tuberculate: the 6 dorsal segments cuspidate.

Inhabits the *White Sea. Act. Petrop.* 1778. *tab.* 8. *fig.* 3.

Antennæ 4: *tail* tufted at the sides."

"*Fuscus.* Brown; shell carinate with a white spot on the thorax.

Inhabits *Denmark.* H. *Mull. Zool. Dan.* 2476.

"*Medusarum.* A little compressed: front obtuse; antennæ very short and pendant: hands 4 compressed and cut.

Stroem. Sundm. 1. *p.* 188. *tab.* 1. fig. 12, 13.

Found under the folds of the *Medusa Capillata.*

"*Cicada.* Compressed, sublinear with four spurious hands: upper antennæ shorter: tail smooth on the back.

Inhabits *Greenland Seas. Fab. fn. Groen. p.* 258. n. 233.

"*Arenarius.* Slightly depressed before, carinate and subserrate behind: 4 fore-legs cheliform and smooth: antennæ nearly equal. *Stroem. Act. Hafn.* 10. *tab.* 2. *fig.* 1–8.

Inhabits the Sandy Shores of *Greenland*, on the Ulva umbilicalis.

"*Stroemianus.* Compressed; 4 fore-legs cheliform and slightly toothed: upper antennæ very short.

Stroem. Act. Hafn. 9. *p.* 558. *tab.* 8.

Inhabits the Shores of *Greenland*. *Body* violet.

"*Abyssinus.* Subcylindrical; 4 fore-legs cheliform and 1-toothed: antennæ subequal setiferous and serrate at the base on the inner margin.

Inhabits *Greenland*. *Fab. fn. Groen. p.* 261. *n.* 236.

Body with white and saffron bands: darts with great velocity in the water.

"These 6 last might probably be referred to the genus Cancer."

In this list, *Cancer* (*Gammarus*) *carino-spinosus*, being without references, is apparently intended for a new species. In the Brit. Mus. Catalogue, Spence Bate names it *Amathia carino-spinosa*, distinguishing it from *Amathia sabinii* "more in deference to the opinions of Rathke, Liljeborg, and Bruzelius, than from a conviction of there being any real distinction between them." Boeck accordingly makes "*Cancer carino-spinosa*, Turton, Linn. Syst. Nat. III. p. 760. (ifølge Spence Bate)" a synonym of *Amathilla sabini*, without observing that Bate and Westwood, vol. i. p. 362, declare that Turton's species is *Atylus carinatus*. On page 363, they say further, "it is quite evident that the latter [Turton] never examined the animal of unknown habitat in the British Museum, which he cites, but that his knowledge was derived from the Fabrician description of *Atylus carinatus*, the name of which he unnecessarily altered." The species, *Cancer* (*Gammarus*) *corniger*, though also without references, is clearly the *Gammarus corniger* of Fabricius, now called *Epimeria cornigera*. It will be observed that for *Cancer* (*Gammarus*) *medusarum* and for *Oniscus* (*Cymothoa*) *medusarum*, Turton gives the same reference to Strom without any attempt at explanation.

1802. Latreille, P. A.

Histoire Naturelle, générale et particulière des Crustacés et des Insectes. Ouvrage faisant suite aux Œuvres de Leclerc de Buffon, et partie du Cours complet d'Histoire naturelle redigé par C. S. Sonnini. Tomes I.–IV. A Paris. An X.

In vol. i. p. 45, he recognises that the Stalk-eyed Crustacea or *pédioeles* of Lamarck have an organization evidently distinct from insects, but the Sessile-eyed Crustacea come so near the insects, by the form of the vessel regarded as the heart, that he would have been well content for the present to leave the Crustacea at the head of the insects, only forming a subclass of them.

Vol. ii. opens with a table giving "Divisions générales des animaux invertébrés et pourvus de pattes." The Crustacés, Class I. have "Mandibules palpigères. Des pièces articulées doubles ou bifides, disposées sur plusieurs rangs, et fermant la bouche. *Quatre antennes.*" These form two orders, Les Décapodes, "Tête confondue avec le corselet. Branchies cachées," and Les Branchiogastres, "Tête distincte. Branchies extérieures." The Insectes, Class II., include four subclasses, the first of which is named les Tetracères, and the fourth les Entomostracés.

An explanation of earlier classifications is given pp. 292–365. After Aristotle he considers that Aldrovandus was the first systematist to make any advance, then Willulghby

[Willughby], whose method is more commonly attributed to Ray, who adopted and developed it.

In vol. iii. p. vii. n. 1, Latreille remarks that, since the publication of his Précis in 1796, the name *insect* had been restricted in its application, he therefore now says, "je nomme *Condylipodes* les animaux que Linnæus appelle *insectes*, et qui forment, dans la méthode du professeur Lamarck, trois classes; les *crustacés*, les *arachnides* et les *insectes*." He alters the classification of the preceding volume, making the Entomostraca now the first subclass of the Crustacea, the second subclass being the Malacostraca. In these latter the Branchiogastra, p. 35, are the second order, with two families; 1. Squilliares; *squillares*; including the genera *Squilla* and *Mysis*; 2. Crevettines; *gammarinæ*, thus defined:—"Corps formé d'une suite d'articles de longueur à peu près égale, ou dont le premier du moins n'est pas beaucoup plus grand que les autres. Yeux sessiles. *Extrémité postérieure du corps sans appendices, ou à appendices styliformes*," and including the genera *Phronima*, *Talitrus*, *Gammarus*, *Caprella*, *Cyamus*.

The new genus "Phronime; *phronima*," is thus defined:—"Antennes apparentes au nombre de deux, presque sétacées, de trois articles. Des palpes saillans, sétacés. Dix pattes; les quatre antérieures et les quatre postérieures terminées par une pièce conique, un peu arquée; celles de la troisième paire les plus longues, et terminées par une main ayant deux pinces. Derniers anneaux étroits; plusieurs styles alongés, articulés et bifides, à l'extrémité du corps. *Corps mou. Tête fort grande. Animal vivant dans un corps oralaire, transparent, presque gélatineux*, (*Cadavre d'un* béroë?). Exemple. *Cancer sedentarius*, Forsk."

Next he defines "Genre. Talitre; *talitrus*. Antennes simples: les intermédiaires supérieures et plus courtes que le pédoncule des latérales et inférieures. (Dix à quatorze pattes.) Une queue; des pièces articulées au bout. Exemples. *Gammarus locusta*, Fab. *Oniscus gammarellus*, Pall." He then proceeds to define the genus "Crevette; *gammarus*," adding a remark on this and the preceding genus:—"Othon Fabricius a décrit plusieurs crustacés qu'il faut, je pense, rapporter à ces deux genres. On placera parmi les talitres les suivans: *oniscus serratus, cicada medusarum*; avec les crevettes les autres: *oniscus arenarius, strœmianus, abyssinus*."

He defines "Chevrolle; *caprella*, Lam.," with *Gammarus linearis*, Fab., and *Squilla lobata*, Oth. Fab. as examples.

He defines "Genre. Cyame; *cyamus*. Corps large, court. Pattes courtes, dont quatre au moins fausses vers le milieu du corps; les autres terminées par un crochet. Point de queue ni de pièces articulées au bout. Exemple. *Oniscus ceti*, Linn. *Remarq.* Je ne suis pas sûr que les deux genres précédens soient de cet ordre."

Then follow the Insecta as Classe Seconde, with the Tetraeera as first subclass, containing the two families "*asellota*" and "*oniscides*."

At the opening of vol. iv. Latreille repeats his reasons for using, instead of the Linnæan *insectes*, the denomination Condylipodes, *condylipoda* (pattes noueuses), and for placing the Crustacea at the head of the division. As before, he relies on the observations especially of Swammerdam in olden times, and of Cuvier and Lamarck, his contemporaries. Among other remarks on classification he says, p. 8, "Si j'examine attentivement, en effet, la série naturelle des genres, je vois que les crabes me conduisent aux écrevisses, que de celles-ci j'arrive presque sans saut aux crevettes (*gammarus* F.); de là aux aselles, aux cloportes, enfin aux iules et aux scolopendres; et comme je découvre dans ces derniers animaux des stigmates, je dois penser que les arachnides, les insectes proprement dits doivent leur succéder."

1803. LATREILLE, P. A.

Histoire naturelle, etc. Tomes V.–VI. A Paris. An XI.

This volume opens with the Histoire des Malacostracés, notices how little attention was paid them from the time of Aristotle till we come to Belon, Rondelet, Gesner, Aldrovandus, with whom they still remain between the Mollusca and the Testacea. Jonston was only a compiler. Swammerdam in *bernard l'hermite* discovers a heart or at least a principal organ of circulation "différent du vaisseau dorsal et noueux des insectes. Ce crustacé trouve son rang avec eux; il est compris avec les insectes du premier ordre, ou ceux qui sortent de leur oeuf parfaitement formés et pourvus de tous leurs membres." Klein rejected Linnæus's arrangement of Aptera. "Ses animaux multipèdes sont partagés en deux sections. La première est destinée à ceux qui sont cuirassés, *loricata:* elle est remplie par six ordres, dont les cinq premiers appartiennent aux crustacés, et le dernier aux scorpions. La seconde section est celle des insectes; là se voient les scolopendres, les iules, les cloportes, les araignées, etc." Latreille then gives the system of Lefrancq de Berkley, who, he says, "de nos jours, a le premier séparé les malacodermes ou les crustacés des naturalistes des insectes." But this seems to be an error, as, except that he places Man in a first division by himself, the nine groups of his second division correspond with those of Brisson.

Vol. vi., pp. 270–331, contains the fuller account of the Branchiogastra. The species given are *Phronima sedentaria*, Forsk., *Talitrus locusta*, Fabr., *Talitrus gammarellus*, Pall., *Talitrus gryllus*, Bosc., *Talitrus medusarum*, Fab., *Talitrus cicada*, Oth. Fab., *Gammarus pulex*, Fab., *Gammarus cancellus*, Fab. (with a suspicion that it is the same as *Gammarus carinatus*, Fab.), *Gammarus ampulla*, Fab., *Gammarus nugax*, Fab., *Gammarus longicornis*, Fab., *Gammarus corniger*, Fab., *Gammarus esca*, Fab., *Gammarus spinicarpus*, Müller, *Gammarus homari*, Fabr., Suppl. ent. syst. p. 418, Stroem. Act Hafn. 10. 5. tab. 2. *Gammarus arenarius*, Oth. Fab., *Gammarus abyssinus*, Oth. Fab., *Gammarus serratus*, Oth. Fab., followed by the remark "Les crevettes suivantes de Fabricius ou de l'Encyclopédie méthodique appartiennent à d'autres genres; *Gammarus linearis*, Fab. Voyez chevrolle. *Gammarus filiformis*. Oliv.—*Cancer filiformis*. Lin. Voyez Tom. IV de cette Histoire, p. 330, le second entomostracé décrit par Godeheu Riville. Je crois en effet que c'est une crevette. *Gammarus stagnalis*. Fab. Voyez *branchiopode*. *Gammarus salinus*. Fab. *Idem*. Les autres appartiennent au genre *talitre*, ainsi que le cloporte de Stroemius d'Othon Fabricius, Fauna Groenland. no. 235, et dont nous n'avons point parlé." He proposes to call it *talitre stroemien*. In Müller and in Herbst, he says, there are two Crustacea which belong to this genus, *cancer podurus*, *cancer mutilus*, but their specific characters do not appear to be well established. Under *Caprella* he gives *Caprella linearis*, Linn., and *Caprella ventricosa*, Müller. Under *Cyamus*, "*cyamus ceti*, Lin." On pl. lii. he figures Cyame de la Baleine. On pl. lvi. he professes to figure *Phronima sedentaria*, but it does not appear there. On that plate are Talitre sauterelle and Talitre gammarelle, the latter being an *Orchestia*, the figure of it not original. On pl. lvii. are Crevette puce, representing Roesel's dentate species, and Chevrolle linéaire. In the discussion of *Gammarus pulex* an account is given of some original observations in regard to the heart and other internal organs.

1803–1804. Bosc and Latreille.

Nouveau Dictionnaire d'Histoire naturelle, appliquée aux arts, principalement à l'agriculture et à l'économie rurale et domestique. Par une Société de naturalistes et d'agriculteurs, avec des figures tirées des trois régnes de la nature. Paris, 1803–1804. (Twenty-four volumes).

In this work the Crustacea are described by Bosc, who, it is said, merely repeats what had already appeared in his Histoire naturelle des Crustacés. Desmarest says that "Latreille a inséré dans le dernier volume un tableau méthodique de ces animaux." The work must not be confounded with the so-called new edition in thirty-six volumes, Paris, 1816–1819, for which the Crustacea were described by Latreille.

1804. Montagu, George, born 1751, died 1815 (W. Pengelly, e Biblio. Cornub.).

Description of several Marine Animals found on the South Coast of Devonshire. By George Montagu, Esq., F.L.S. Read December 7, 1802. The Transactions of the Linnean Society of London. Volume vii. London, MDCCCIV., pp. 61–85, Pls. vi., vii.

In this paper three Amphipods are described :—

"Cancer Phasma. Tab. vi. Fig. 3. Cancer linearis, *Linn. Syst. p.* 1056, *Gmelin Syst. p.* 2992. *Bast. Op. Subs.* 1, *p.* 32, *t.* 4, *f.* 11. *Turton Linn.* iii. *p.* 761. Oniscus scolopendroides. *Pall. Spic. Zool.* 9. *t.* 4. *f.* 15. Cancer atomos. *Linn. Syst. p.* 1056. *Gmel. Syst. p.* 2992. *Brit. Zool.* iv. *t.* 12, *f.* 32. *Turt. Linn.* iii. *p.* 761." Montagu thought he had good reason for uniting the species mentioned in the synonymy with his *Cancer phasma*, but nevertheless thought it well to retain the new specific name to prevent further confusion. This species was named *Astacus phasma* by Pennant in 1812, referred to *Caprella* by Leach in 1814, and to *Protella* by Spence Bate in 1862, where it still stands (see Mayer, Caprell., p. 29) at the head of a long list of synonyms, though one quite different from Montagu's list. His imperfect description is as follows:—"With a slender body of six joints, independent of the head: on the first joint are two spines, a third on the fore part of the second joint, and a fourth on the head, all pointing forwards: the rest of the body smooth: antennæ four, the upper pair nearly as long as the body; lower pair half that length, and the extreme joint of each pectinated with bristles: eyes fixed, reticulated, usually of a reddish colour: close to the mouth are two very short palpi, or feelers, with hooked claws; behind these are two others much longer, armed with single moveable fangs: on the first joint of the body are two long arms, with very large oblong oval hands, furnished with a strong spine on the inside, and a long moveable fang, which is capable of closing upon the spine, in order to secure its prey: the front of the hand in some is also narrowed and elongated into a spine; the second and third joints of the body are each provided with a pair of flat oval fins; the three posterior joints are each furnished with a pair of long slender legs, with a single hooked claw; the hindmost are the longest, and originate from the extremity of the body, the animal being destitute of tail. Length rarely exceeds three-quarters of an inch, and seldom so much: colour various, sometimes red, but more commonly pellucid olive green. The female differs in possessing several plates or valves beneath the body, situated between the two pairs of fins: the office of these is to carry and protect its eggs or young, at which time they extend very considerably, and form a kind of pouch. We have seen this receptacle distended with ova, from fifteen to twenty, readily distinguished through the transparent plates. In this part a very strong pulsation is observable."

"Cancer palmatus, Tab. vi. Fig. 4. With a smooth, somewhat compressed body, with thirteen joints: colour, when dead, pale yellowish brown: antennæ four, superior pair longest, half the length of the body; each pair composed of three large joints, with several small articulations at the end: eyes large, fixed: arms two; hands remarkably large, flat, triangular, furnished at the upper angle with a moveable fang, capable only of closing upon the middle or palm, which is formed a little concave; the back of the hand convex; joint of the wrist deeply cut or indented on the lower side: legs six; thighs broad, flat: caudal fins two pairs, subulate, with two joints each; the extreme joint of the tail is furnished with two small appendages; the next joint with two minute spines; the third joint with a single spine Length, three-eighths of an inch." This is now called *Melita palmata*.

"Cancer articulosus, Tab. vi. Fig. 6. With an oblong, smooth, glossy body, a little compressed on the sides, with eleven joints, of a cream colour when dead: antennæ four, the upper pair longest, but not half so long as the body: eyes large, of a garnet colour, immoveable: arms four, of a very singular form; the foremost pair with a subglobose, cheliform hand, with the fixed claw very slender, and the moveable one, or thumb, long and double-jointed, or furnished with an additional hooked fang at the end: second pair with an ovate, oblong hand, furnished with one long moveable hooked fang; at the wrist arises a compressed slender plate, projecting forward, and almost meeting the fang when closed: legs five pairs, small, subulate: tail terminated by several slender, flat, caudal fins. Length, half an inch. Inhabits the deep: taken by the dredge amongst shells and algæ." This, having since been identified with *Gammarus spinicarpus*, Abildgaard, 1789, and made the type of a new genus, is now called *Leucothoë spinicarpa*.

1805. Viviani, Domenico.

Phosphorescentia maris quatuordecim lucescentium animalculorum novis speciebus illustrata a Dominico Viviani. Genuæ, 1805.

In his discussion of the causes of the phosphorescent appearance of the sea, Viviani says "Lucescentibus animalculis immixtæ, nonnullæ reperiuntur in mari species, quæ licet ob parvam

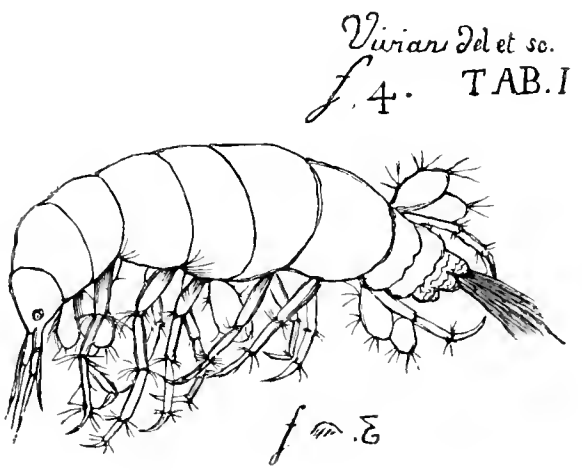


Fig. 16.

corporis molem, et reliquam ejusdem compagem, maxima adfinitate uniantur, nulla vero phosphorica facultate gaudent. (Gammarus crassimanus *nob.* Gammarus Pulex, stagnalis,

Locusta: *Fabric.*)." On the other hand Desmarest, Consid. gén sur la Cl. des Crust., p. 267, says of *Gammarus locusta*, Leach, "M. Surriray, du Havre, a remarqué qu'elle est phosphorescente." Viviani has brought his species into the Fabrician genus of *Gammari*, he tells us, by their conformity in the number and shape of the antennæ. These he calls "*longissimas* cum corporis longitudinem duplo superant, *brevissimas* cum corporis mediam longitudinem non attingunt," always making his comparative measurements with the longer pair. The descriptions are as follows:—"Gammarus caudisetus. (*Tab. I. Fig. 3, 4*). Gammarus Antennis (4) brevissimis, subæqualibus: annulo caudali medio setigero. Reperi . . . . in aquis Portus Genuæ: *Sotto il Molo Vecchio*. *Corpus* oblongum, rubescens, decem segmentis compositum, capitis segmento obusé [obtuse] conico. *Oculi* duo nigrescentes, turgidi, secus antennas siti. *Antennæ* quatuor, quadruplò corpore breviores. In antennis superioribus, articuli duo primi elongati, mediam earumdem longitudinem æquantes; ultra medium setaceæ. *Inferiores* basi a superioribus ita tectæ, ut nunquam earumdem structuram perlustrare potnerim, ultra medium tamen et ipsæ setaceæ. *Pedes* dnodecim, 3–4 articulati; in articulatione verticillato setigeri; apice uncinulo recurvo armati. *Laminæ* natatoriæ ovatæ, margine setigeræ, utrinque subtus secundum, et quintum segmentum erumpentes, in segmento octavo utrinque geminæ. *Caudæ* segmentum superné squamulosum, quadrilobnm, emarginaturâ mediâ setularum fasciculo valde mobilium munita. *Color* pallide rubescens."

"Gammarus longicornis (*Tab. II. Fig. 3, 4*). Gammarus Antennis longissimis, capite attenuato; pedibus anticis inarticulatis, brevissimis. Reperi in maris sinubus algosis prope Genuam. A. *S. Nazzaro*. *Corpus* oblongum, 13 segmentis compositum, utrinque attenuatum, dorso emarginatum; capitis segmentum subcylindricum, incurvatum, apicem versus paulò angustius. *Antennæ* 4 longissimæ; articulus primus in singulis extuberans brevissimus, duo subsequentes quadruplo longiores, tenues, reliqui brevissimi, setulis binis ad internodia muniti, articulis ita sensim diminutis, ut post tertium, antennæ setaceæ evadant. *Oculi* inter antennarum superiorum, et inferiorum basim siti. *Pedes* sex biarticulati, apice uncinati. *Pedes branchiales* inarticulati, apice longe setigeri. Capitis segmentum, et subsequens tribus utrinque muniuntur falsis pedibus brevissimis, unico cylindrulo formatis, apice brevissimis setis ciliato; ad cibum captandum fortasse accommodatis. *Cauda* laminnlis ellipticis setulosis sex componitur, ex ultimo corporis segmento prodeuntibus. *Color* diluté flavescens.

"Gammarus truncatus (*Tab. II. Fig. 5, 6*). Gammarus capitis segmento antice truncato, candæ recurvo, antennis superioribus duplo brevioribus. Reperi cum præcedenti. *Corpus* subcylindricum, posticé attenuatum, segmentis duodecim, caudalibus recurvis, caput anticé truncatum, subtus coarctatum. *Antennæ* quatuor: inferiores superioribus duplo longiores, corporis totius mediam longitudinem non excedunt; in utroque pari articuli primi paulo extuberantes, reliqui breviores, sensimque tenujores, in articulationibus setigeri. *Oculi* pone antennas inferiores siti. *Tentacula* duo cylindrica, filiformia, inarticulata. *Pedes* decem, triarticulati, brevi uncinulo muniti, hispidi: *Branchiales* sex, é tuberculo prodeuntes, cylindrici, apice setularum longo fasciculo muniti. *Caudæ appendices*, cylindruli quatuor recurvi, hispidi, penultimum inter, et anterius caudæ segmentum inserti. *Color* dilutissime flavescens.

"Gammarus circinnatus (*Tab. II. Fig. 9. 10*). Gammarus subcylindricus, segmentis 2–6 ad latera utrinque in appendicem circularem exeuntibus, caudalibus reliqua subæquantibus. Reperi cum præcedente. *Corpus* subcylindricum, segmentis decem conflatum, tribus caudalibus latere inferiori postico angulatis, reliqua fere magnitudine subæquantibus. Capitis segmentum cylindricum, anticé rotundatum. *Antennæ* superiores, corpore duplo breviores, ultra medium setaceæ. Articuli tres primi sensim minores, spinulis setulisque in articulatione armati. Par inferius, superiori duplo brevius; post primum articulum elongatum antennæ setaceæ evadunt. *Tentacula* duo triarticulata: articulo primo cylindrico, altero

cordiformi, tertio ovato, uncinulo instructo. Segmenta 2, 3, 4, 5, 6 utrinque in appendicem rotundum exeunt pellucidum ovulorum glomerem tegentem (*Fig. a*). *Caudales appendices*; cylindrula duo recurva, quinque articulata, quibus duo tenujora, inarticulata spinulosa, longitudine subæqualia, adiiciuntur. *Pedes* decem, quorum duo anteriores, articulo primo cylindrico, duobus subsequentibus majoribus apice emarginatis, ultimo oblongo, uncinulo armato componuntur. Pedes reliqui triarticulati, longo uncinulo aucti: *Branchiales* sex, unico articulo formati: apice setigero. *Color* ex flavescenti dilutissime rubescens."

"Gammarus heteroclitus (*Tab. II. Fig. 11, 12*)," appears to be a species of *Tanais*. Of it

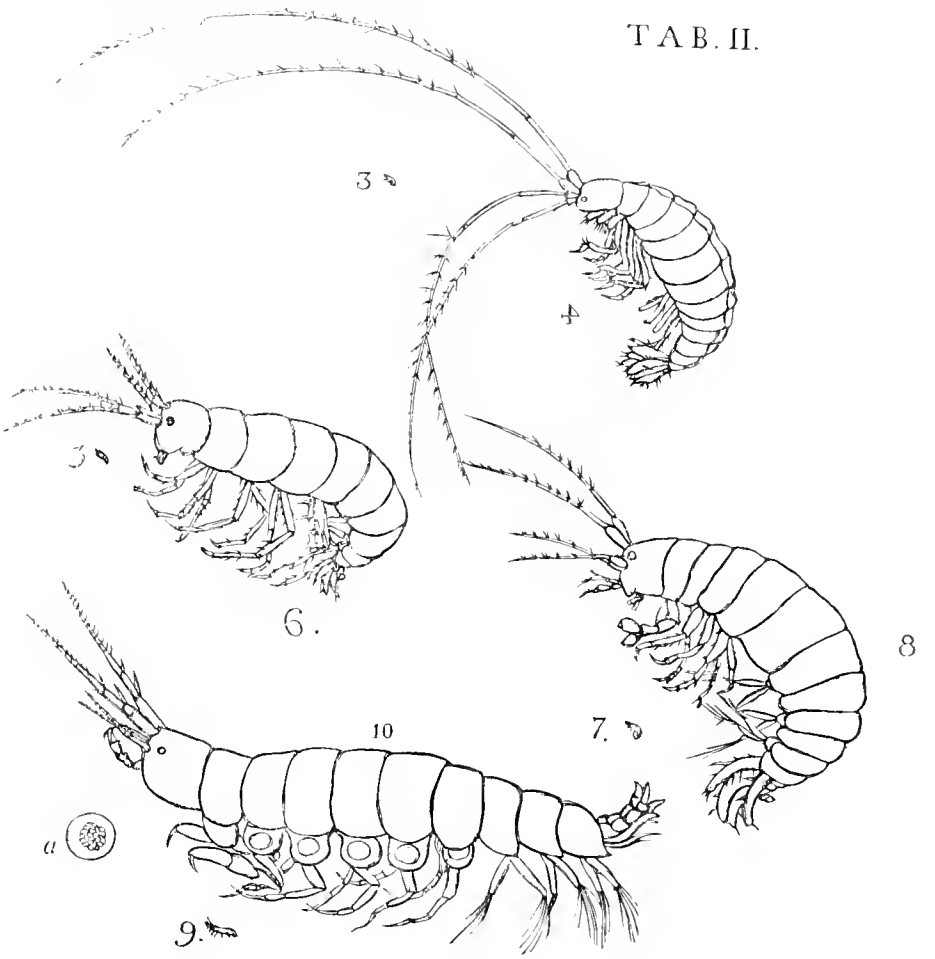


Fig. 17.

Viviani says "Antennarum formâ et insertione species hæc novum fortasse genus exposceret, quod habitus totius corporis a Gammaris diversissimus confirmaret."

"Gammarus crassimanus (*Tab. II. Fig. 7. 8*). Gammarus ventricosus: caudâ reflexâ; anterioris pedum paris tarsis inerassatis, chelâ granulatâ. Reperi cum præcedentibus. *Corpus* oblongum, ventricosum, antice truncatum, in cauda attenuatum recurvum, segmentis 17 compositum. *Capitis* segmentum subcylindricum, subtus veluti in rostrum breve coarctatum. *Antennæ* quatuor, mediam totius corporis longitudinem paulò excedentes, setaceæ, articulo primo brevi ventricoso, subsequente elongato tenui, reliquis sensim tenuioribus brevissimis.

Antennæ inferiores duplo breviores, structurâ superioribus conformes. *Oculi* inter utrumque antennarum par siti, latiusculi, nigri. *Tentacula* quatuor, quorum antica duo biarticulata, articulo primo cylindrico, extimo falcato, ramulosé pilifero. *Inferiora* subtus caput prorumpentia filiformia, inarticulata, flexilia. *Pedes* octo, duo anteriores crassiores, articulo primo cylindrico, duobus subsequentibus obcordatis, extimo seù chelâ, obovato, turgido, granulifero: reliqui triarticulati, uncinulo armati. *Pedes branchiales* sex, articulo unico elongato formati apice setigero, é tuberculo caudali prodeuntes. *Appendices* caudales quatuor, cylindrici, recurvi, hispidi, inter duodecimum et tredicesimum segmentum erumpentes."

It might be possible for some one residing at Genoa to identify these Genoese Amphipoda. The figures given to represent the natural size are so minute as to suggest some error. Fig. 4, pl. i. is suggestive of *Hyperia medusarum*, though the eye is represented only by a small o. Fig. 6, pl. ii. may represent *Hyale* sp. Fig. 4, pl. ii. ought to be capable of identification by the extreme length of the antennæ of both pairs, but of the upper pair especially. The name *Gammarus longicornis* is preoccupied among the synonyms of *Corophium volutator*. Spence Bate has suggested the identity of *Gammarus crassimanus* with *Mæra truncatipes*. Desmarest, Consid. gén. sur la Cl. des Crust., p. 265. n., also thinks it probable that it belongs to the same genus as *Mæra grossimanus*. Boeck thinks it is perhaps a *Gammarus*. In his view, *Gammarus circinnatus* seems to be a species of *Amphithoë*. Milne-Edwards and Spence Bate alike omit Viviani's species from their general lists of Amphipoda, and in the special lists of Mediterranean species by Costa, 1830, by Hope, 1851, by Stalio, 1877, and by Carus, 1885, no notice is taken of them.

1806. Duméril, André Marie Constant, born 1774, died 1860 (Hagen).

Zoologie Analytique, ou Méthode Naturelle de Classification des Animaux, rendue plus facile à l'aide de tableaux synoptiques. Paris. M.DCCC.VI.

Duméril rejects the precept of Linnæus and Fabricius to draw the characters of classes, orders, and genera from one and the same part, as inapplicable to zoology, however suitable it might be to botany. He prefers the natural method, which studies all the parts of an organism, with a view to its classification. In regard to the Crustacea he follows Latreille and Lamarck. He makes nine "general divisions" or classes, the Crustacea being the sixth, between the Mollusca and the Insects. The Crustacea are defined as "Animaux sans vertèbres, munis de vaisseaux et d'organes respiratoires sous forme de lames ou de branchies; pattes le plus souvent au nombre de dix." They form two orders, Entomostracés and Astacoides. The latter, "à croûte calcaire," contain four families, Macroures, Carcinoïdes, Oxyrinques, and Arthrocephalés. These last, "à tête séparée du corcelet," correspond to the Branchiogastres of Latreille. The name is derived "De Αρθρον membre qui se meut, et de Κεφαλη tête." An alternative name is Capités. The following definition and table is given:—"Crustacés à pattes ordinairement au nombre de quatorze; à branchies apparentes vers la queue et à tête articulée sur le corcelet.

				Genres.
"A yeux.	pedonculés; . . .	six paires de pattes en nageoires, . . .		*Mysis.*
		point de pattes en nageoires, . . .		*Squille.*
	sessiles; la troisième paire de pattes, . .	terminée par deux serres, . . .		*Phronime.*
		simple; antennes intermédiaires plus,	longues, . . .	*Crevette.*
			courtes, . . .	*Thalitre."*

He makes the following remarks upon the Amphipoda—"Le genre *phronime* (*phronima*) est encore du même naturaliste [Latreille]. Il comprend un animal très-singulier, qu'on a observé dans un corps gelatineux transparent, qui n'a que deux antennes et dix pattes dont la troisième paire, plus longue que les autres, est armée de deux pinces; le corps se termine par plusieurs filets fourchus. Le genre thalitre (thalitrus, du même auteur) ressemble beaucoup à celui des crevettes. Les *crevettes* (*gammarus*, Fab.) diffèrent de tous les autres astacoïdes par la forme du second segment du corps, lequel n'est pas plus long que ceux qui viennent immédiatement après, par les appendices fourchus qui se remarquent à l'extrémité et sur les côtés de la queue; enfin par l'immobilité des yeux, qui sont à-peu-près disposés comme ceux des asselles et des cloportes, insectes avec lesquels les crevettes semblent se lier. Ces crustacés vivent dans les eaux douces et salées; ils nagent fort rapidement et toujours sur le côté."

The sixtieth or last family of the Insects, among the Aptera, is called Quadricornes or Polygnates, and contains three genera, *Physode*, *Cloporte*, *Armadille*, with the remark that *physode* (*physodes*, Fab.) answers to the *asellote* family of Latreille. He considers that the "Polygnates semblent faire le passage des insectes aux crustacés, dont ils diffèrent seulement par le défaut de branchies."

1806. LATREILLE, P. A.

Genera Crustaceorum et Insectorum secundum ordinem naturalem in familias disposita, iconibus exemplisque plurimis explicata. Tomus Primus, Parisiis et Argentorati, 1806. (The other three volumes 1807, 1809.)

Of the twelve classes into which Latreille here distributes animals, the Crustacea are the eighth, invertebrates with distinct nerves, "Cor; branchiæ; medulla spinalis gangliis plurimis; pedes." Of the Crustacea, the Malacostraca form the second Legion; containing two Orders, the Decapoda and the Branchiogastra, the latter thus defined, "Caput a thorace distinctum; branchiæ externæ, inferæ; pedes sæpissime quatuordecim." Of the Branchiogastra, the first Family are called *Squillares*, the second *Gammarinæ* or *Crevettines*. These latter include the genera *Phronima*, *Talitrus*, *Gammarus*, *Corophium*, *Caprella*, *Cyamus*. The new genus *Corophium* is thus defined:—*Cauda* appendicibus articulatis, subcylindricis. *Antennæ* inferæ crassissimæ, articulis quinque, seta nulla articulata apicali. *Pedes* duo antici manu parva (ungue mobili, pollice instructa)." The type species is *Corophium longicorne*, taking its specific name from the synonym, *Gammarus longicornis*, Fab., instead of taking it, as it should do, from the earlier synonym, *Oniscus volutator*, Pall. A final note remarks, "Genera *Symethis*, *Posydon*, mihi ignota." *Phronima sedentaria* and its habitation are figured on pl. ii.

The Tetracera are the first Legion of the Ninth Class, Apterous Insects, and comprise two Families, the Asellota and the Oniscides.

1808. MONTAGU, GEORGE.

Description of several Marine Animals found on the South Coast of Devonshire. Transactions of the Linnean Society, vol. ix., London, MDCCCVIII. pp. 81–114, pl. ii.–viii. (Read June 18, 1805).

At page 92 Montagu gives "CANCER GAMMARUS LOCUSTA. Tab. iv. Fig. 1. Cancer Locusta. *Gmel. Syst. p.* 2992. *Turt. Linn.* iii. p. 760. Oniscus Gammarellus. *Pallas Misc. Zool. t.* 14. *f.* 25. *Id. Spic. Zool.* 9. *t.* 4. *f.* 8." Although the accessory flagellum of the upper

antennæ is not noticed, this is clearly *Gammarus locusta*, Linn., and as Montagu professedly mentions it only to clear it from confusion with other species, it is singular that he should place in the synonymy *Oniscus gammarellus*, Pallas, which is an *Orchestia*. He describes the eyes as "lunated, fixed," with an explanatory note, "Not pedunculated, or moveable, but fixed under the shell of the thorax; a circumstance common, I believe, to all this family." The epithet in "hands sub-cheleferous" he also explains in a note, as "A term adopted for a single fang capable of closing upon the hand, answering the purpose of a fixed claw, in contradistinction to cheleferous, or such as are formed with double claws."

On page 93 he gives "Cancer Gammarus Pulex. Tab. iv. fig. 2. Cancer Pulex. *Gmel. Syst. p.* 1055. *Turt. Linn.* iii. *p.* 760. *Brit. Zool.* iv. *p.* 21. *No.* 33." This, he remarks, "is as incapable of living in salt water as the *C. Locusta* is in fresh, although we have the authority of Linnæus and many of his disciples to the contrary. It is also incapable of leaping, and very soon dies when taken out of water."

On page 94 is "Cancer Gammarus Saltator. Tab. iv. fig. 3. Cancer Locusta. *Brit. Zool.* iv. *p.* 21. *No.* 34. Oniscus Locusta. *Pallas Spic. Zool.* 9. *t.* 4. f. 7. *Misc. Zool. t.* 14. *f.* 15." Of this Montagu says, "The *C. Saltator* is without doubt the animal referred to by Pallas, and this confirms the opinion that Gmelin has confounded it with his *Cancer Locusta*, having quoted both the *Oniscus Gammarellus* and *O. Locusta* of that author for it. That it is Pennant's *C. Locusta* there can be little doubt, as he particularly mentions the quality of leaping, a power denied to the other species." Montagu's figure very clearly depicts what is now known as *Talitrus locusta*, Pallas. As he makes no reference to Klein's *Squilla saltatrix*, 1743, the specific name *saltator* was probably not borrowed from that source.

On page 96 he gives "Cancer Gammarus littoreus. Tab. iv. fig. 4. Pulex marinus. *Baster Op. Subs.* ii. *p.* 31. *t.* 3. *f.* 7. 8." "The *C. littoreus*," he says, "is doubtless the species figured by Baster as above referred to, and which Gmelin has erroneously quoted for the Linnean *Cancer Pulex*." This is pretty clearly the *Oniscus Gammarellus* of Pallas, which Montagu himself has erroneously quoted for the Linnean *Cancer locusta*. Its name, therefore, should be, as Boeck gives it, *Orchestia gammarellus*, Pallas.

On page 97 he gives "Cancer Gammarus grossimanus. Tab. iv. fig. 5." This is a new species. It is now called *Mæra grossimana* (? better, *grossimanus*).

On page 98, "Cancer Gammarus Talpa. Tab. iv. fig. 6.," now called *Apseudes talpa*, belongs to the Tanaidæ.

On page 99, "Cancer Gammarus rubricatus. Tab. v. fig. 1." is a new species, which was referred by Leach to his genus *Amphithoë*. It includes, I believe, *Amphithoë littorina*, Sp. Bate, and three or four other synonyms from species founded chiefly on immaterial distinctions in colouring.

On page 100 is given the new species "Cancer Gammarus falcatus. Tab. v. fig. 2." This Leach considered to belong to the genus *Jassa*, which he instituted with the species *Jassa pulchella* and *Jassa pelagica*, establishing at the same time the genus *Podocerus* with the species *Podocerus variegatus*. Milne-Edwards gave *Cancer falcatus* and *Jassa pelagica* to *Cerapus pelagicus*, to *Podocerus variegatus* he left its name, and changed *Jassa pulchella* into *Podocerus pulchellus*. Spence Bate gave the four as separate species of *Podocerus*, to which more recently all four have been assigned as a single species. Boeck united the names *pelagicus* and *pulchellus* as synonyms to Montagu's *falcatus*, no doubt correctly, but it seems curiously perverse that he should assign Leach's three species of *Jassa* to *Podocerus* and Leach's species of *Podocerus* to *Janassa*, altered without due reason from *Jassa*. *Janassa* may well fall to *Podocerus* as being too near for generic distinction, but, if not, the species in question would have to be named *Jassa falcata*, Montagu, and *Podocerus variegatus*, Leach. It is rather singular that Montagu should finish his account with the words "This curious and rare species inhabits the deep, amongst *Sertularia*, and *Algæ*, and has

only been taken by dredging at Toreross." As a matter of fact now-a-days at Torquay and Ilfracombe, in shore-pools, the *pelagicus* and *pulchellus* forms are extremely, not to say tiresomely, abundant.

After describing two species of *Phalangium*, on page 102 Montagu gives "Oniscus Testudo Tab. v. fig. 5. Body sub-ovate, composed of eight joints rising to a ridge on the back; the plates elevated at their edges; the four first fall very low on the sides, and obscure the anterior legs; along each side of the body a row of small tubercles; the front sub-bifid; antennæ four, very short, lower pair hid beneath: eyes prominent, black: posterior end obtusely pointed; caudal fins beneath, obscure: legs fourteen, short and strong, the three posterior pairs longest; all furnished with a simple claw. Length two lines. Colour dull red, with a white spot on the anterior part of the back, but as the insect dies this mark is lost. Rare." By Bate and Westwood, Brit. Sess. Crust., vol. i. part 5, p. 228, 1862, this is made the type of a new genus *Pereionotus*. See also Brit. Mus. Cat., p. 375, 1862. These authors recognise that "this genus bears a near relationship to that of *Phlias* of Guérin," 1836. They only find indeed one distinction of importance, that while *Pereionotus testudo* has the last uropods uniramous, *Phlias serratus*, taken on the voyage from the Falklands to Port Jackson, has these uropods biramous. A specimen from the Mediterranean which Spence Bate has named *Phlias rissoanus*, he unfortunately left unexamined in regard to the last uropods. Grube's genus *Ieridium*, 1863–4 would seem undoubtedly synonymous with *Pereionotus*, but that its author declares that his *Ieridium fuscum* has no telson. Carus, Prodr. Faun. Medit., 1885, gives under "Ieridium Grube (*Phlias* Guér.)," "I. Rissoanum Catta (*Phlias Rissoana* Sp. B., *I. fuscum*, Gr.). ♀." That further investigation will unite *Phlias*, *Pereionotus*, and *Ieridium* in one genus seems not improbable. In that case *Phlias*, Guérin, will take precedence, with *Oniscus testudo*, Montagu, for the type species.

1810. Latreille, P. A.

Considérations générales sur l'ordre naturel des Animaux composant les classes des Crustacés, des Arachnides, et des Insectes; avec un tableau méthodique de leurs genres, disposés en familles. Paris, 1810.

The first part, pages 9–87, reviews in general the work that had been done up to that time in regard to the classification of the groups mentioned in the title. In the second part, the Crustacea are divided into two Orders, Entomostraca and Malacostraca. The Malacostraca are divided into seven families, the first five with "tête confondue avec le corcelet," the sixth and seventh with "tête distincte du corcelet." The sixth, or *Squillares*, has "Yeux pedieulés." The seventh, Crévettines, *Gammarinæ*, has "Yeux sessiles." In this last, two groups are formed, the first containing but a single genus, the second much subdivided, as follows:—

"I. *Dix pates.* G. 49. Phronime, *Phronima*."

"II. *Douze à quatorze pates.* 1. *Des appendices articulés et saillans au bout de la queue.* A. *Les quatre antennes terminées par un filet articulé.* G. 50. Crevette. *Gammarus*." "G. 51. Talitre, *Talitrus*." "B. *Antennes inférieures très-grosses, point terminées par un filet, et formées de quatre articles (les deux pates antérieures terminées par une main, avec un doigt ou crochet mobile).* G. 52. Corophie. *Corophium*. 2. *Point d'appendices articulés et apparens au bout de la queue.* G. 53. Chevrolle. *Caprella*." "G. 54. Cyame. *Cyamus*."

On pp. 422–3, species are given for these genera as follows:—"*Phronyme. *Cancer sedentarius*, Forsk. Crevette. *Gammarus pulex*, Fab. Talitre. *Oniscus gammarellus*, Pall. *Corophie. *Gammarus longicornis*, Fab. Chevrolle. *Cancer lineuris*, L. *Cyame. *Pycnogonum ceti*, Fab." The asterisks indicate the genera instituted by Latreille himself.

1811. Stewart, Charles.

List of Insects found in the Neighbourhood of Edinburgh. Memoirs of the Wernerian Natural History Society, vol. i. For the years 1808–9–10. Edinburgh, 1811. Pp. 566–577.

Among the Aptera, under the genus *Cancer*, he gives the names *Gammarus*, *Pulex*, and *Locusta*. *Cancer gammarus* of Linnæus, it should be remembered, is not an Amphipod.

1812. Thomas Pennant.

British Zoology, a new edition. In four volumes. Vol. iv. Class v., Crustacea. vi. Vermes. London, 1812.

He here adds to his *Astacus linearis* the reference "Herbst. Canc. ii. 142. t. 26. f. 9. A. 10. B." *Astacus atomos* is now called *Astacus phasma* or Phantom Lobster. The figure is on pl. xiii. 2. *Astacus locusta* now has the references "C. locusta, Gm. Lin. 2992." "Faun. Suec. 2042." "Oniscus gammarellus. Pallas Misc. Zool. t. 14. f. 25." "Linn. Trans. ix. 92. tab. 4. fig. 1." Additional references are given for *Astacus pulex*. *Astacus saltator* appears with references to "C. saltator. Linn. Tr. ix. 94. t. 4. f. 3." "Oniscus locusta. Pallas Misc. Zool. t. 14. f. 15." "Roesel Insect. iii. tab. 62." "C. locusta. Br. Zool. iv. 21." "Herbst. Canc. ii. 127. t. 36. f. i." Under the generic name of *Astacus*, Montagu's species *littoreus*, *grossimanus*, *rubricatus*, *falcatus*, *palmatus*, are given from the "Linn. Tr. ix. 91–100," and *articulosus* from "Linn. Tr. vii. 70," whence in reality *palmatus* also comes. On p. 40, *Oniscus testudo*, Montagu, is given. It is clear that for his fresh references, as well as for the new species, Pennant is indebted to Montagu's papers.

1813. Montagu, George.

Descriptions of several new or rare Animals, principally marine, discovered on the South Coast of Devonshire. Transactions of the Linnean Society. Vol. xi. First Part. MDCCCXIII. Pp. 1–26, pls. i.–v. Read April 7, 1807. (The bound volume is dated 1815, but the separate first part as above.)

On page 3 Montagu gives "Cancer Gammarus spinosus. Tab. II. fig. 1," which Leach afterwards called *Dexamine spinosa*. He hints that Turton's briefly described *Cancer gammarus carino-spinosus* may be the same species, but this is decided by Bate and Westwood to be *Atylus carinatus*, Fabr.

On page 4 is given "Cancer Gammarus galba. Tab. II. fig. 2. Body ovate, somewhat elongated at the tail, smooth, glossy, and when alive of an olive-green minutely speckled with brown, but by drying becomes rufous-brown; antennæ of the male remarkably short; in the female two pairs extremely long and slender, nearly equal to the length of the body; joints of the body, independent of the head, and the joint to which the caudal fins are attached, eleven; the head is large, and much resembles that of a maggot, and in the male appears to have no division between the eyes, but a continuation of the same transparent membrane covers the whole; the eyes of the female are very large, but distinctly marked by a division; the two pairs of anterior legs, like those of *C. spinosus*, are small, and not subcheliferous, but occupy the place of arms, and scarcely differing in any respect from the other five pairs, all of which are furnished with a very small claw; abdominal fins three pairs; caudal fins

five, flat, and bifid; the middle one very broad, concealing the others which are capable of spreading laterally. Length, half an inch or more. The female is rather more slender in the body, and does not so suddenly decrease towards the tail. The eyes, as beforementioned, are distinct, and are of a bright red when alive, reticulated, and marked with two streaks of black, one on each side of the eye, probably the reflection of a pupil. This is another species of *Cancer* that very nearly approaches the genus *Oniscus*, and is readily distinguished by the larva-like appearance of its head. It is not uncommonly taken with the last." It should be noticed that this description differs strikingly in some respects from that given of *Hyperia galba* by Bate and Westwood. Their species is fawn or faint yellow speckled with red, and has green eyes. Montagu's species is olive-green speckled with brown, and has red eyes. Boeck unites both of them as synonyms of *Hyperia* (*Cancer*) *medusarum*, O. F. Müller, but does not notice the colouring, nor that in the expression five caudal fins. Montagu attributes to his species only two instead of three pairs of uropods, nor that he gives the long antennæ to the female instead of the male. Montagu's remark that his species is not uncommonly taken together with *Dexamine spinosa*, if applied to *Hyperia medusarum*, seems scarcely in accord with common experience, although various Gammarina are occasionally taken upon *Medusæ*. In the figure, it is the first uropods, not the last, that extend furthest backwards.

On page 5 he gives "Cancer Gammarus Monoculoides. Tab. II. fig. 3." "This species," he says, "seems to connect the *Cancer* with the *Monoculus*, but is more allied to the former in the conformation of its members." Its name at present is *Stenothoë monoculoides*. On the same page is given "Cancer Gammarus obtusatus. Tab. II. fig. 7," now known as *Melita obtusata*.

On page 6 he gives "Cancer Gammarus pedatus. Tab. II. fig. 6. Gammarus pedatus. *Müll. Zool. Dan.* iii. *t.* 101." He does not seem to have been aware that this had been earlier described by Müller as *Squilla ventricosa*. It is now known as *Proto ventricosa*, Müller.

1813–1814. Leach, William Elford, born 1790, died 1836 (Webster).

Crustaceology. The Edinburgh Encyclopædia, conducted by David Brewster, L.L.D., &c., &c., with the assistance of gentlemen eminent in science and literature. In eighteen volumes. Vol. vii. Edinburgh, M.DCCC.XXX. (The issue of the work lasted from 1810–1830, but the title page for each volume bears the date 1830. The earlier numbers ran through several editions. Leach's article, Crustaceology, is referred to by Desmarest, 1825, and others, with the date 1813–1814. Whether it originally appeared with or without the appendix seems uncertain.)

Leach in this article considers that Crustaceology treats of two classes, Crustacea and Arachnides, as distinct from Insecta. Of Brisson he does not as yet seem to have heard, as he thinks that Pennant first separated the Crustacea from insects, although capriciously. Leach himself takes from the Arachnides the orders Tetracera and Myriapoda of Latreille to add them to the Crustacea, and Latreille's Parasita to add them to the Insecta. He divides the Crustacea into three orders, Entomostraca, Malacostraca, Myriapoda; the Malacostraca into three tribes, Brachyuri, Macrouri, Gasteruri. The Gasteruri are thus defined, "Eyes sessile. The joint of the body which receives the head, of the same size with the rest." This tribe contains the following families, Gnathonii (also spelled Gnathionii), Gammarini, Corophionii (also spelled Corophini), Caprellini, Apseudii. Of these the first, with the genus *Gnathia*,

since called *Anceus*, and the last with the genus *Apseudes*, are not usually considered Amphipod families.

In this system we have the following arrangement of the genera and species which came soon after to be called Amphipoda.

"Family XIV. Gammarini.

"1. Superior antennæ shorter than the peduncle of the inferior antennæ. Feet fourteen." "Genus LIII. Talitrus." "*Sp.* 1. *Locusta.*" "*Cancer locusta* of Pennant and Gmelin. *Oniscus locusta* of Pallas. *Gammarus locusta* of Fabricius? *Cancer gammarus saltator* of Montagu. *Talitrus locusta* of Latreille." "*Sp.* 2. *Littoralis.*" "*Talitrus littoralis.* Leach's MSS." This was afterwards dropped. "Genus LIV. Orchestia." "*Sp.* 1. *Littorea.*" "See Plate ccxxi. fig. 6. *Pulex marinus* of Baxter [Baster]; *Cancer gammarus littoreus* of Montagu; *Orchestes littorea*, Leach's MSS.; *Talitrus gammarellus*, Latreille?" "Latreille quotes Baxter's figure which renders it highly probable that this may be his *Talitrus gammarellus;* but as he quotes also the *Oniscus gammarellus* of Pallas, it still remains in some doubt." This confusion on Leach's part probably originates with Montagu. See Note on Montagu, 1808.

"2. Superior antennæ longer; or at least as long as the inferior. Fourteen feet, the third and fourth pair smallest." "Genus LV. Gammarus." "Fresh water. *Sp.* 1. *Pulex.*" "*Cancer pulex* of Linné and Pennant; *Gammarus pulex* of Fabricius and Latreille." "A species which Mr. Leach considers as distinct from *pulex*" is then mentioned, but not numbered. It came from a well in London. "It differs principally from *Gammarus pulex* in having the upper process of the tail much longer. The colour, when alive, was cinereous, but so translucent, that the eyes could not be discovered; it stands in Mr. Leach's cabinet, under the specific name *subterraneus.*" This is probably the same as *Niphargus aquilex*, Schiodte. The species of *Gammarus* are continued under the heading "Marine." "*Sp.* 2. *Locusta.*" "*Cancer locusta* of Linné. Is it *Cancer gammarus locusta* of Montagu? *Linn. Trans.* vol. ix." "*Sp.* 3. *Camylops.*" This is probably only a casual variety of *Gammarus locusta.* "*Sp.* 4. *Rubricatus.*" "*Cancer gammarus rubricatus* of Montagu. *Ampithöe rubricata*, Leach's MSS." "It is a rare species, and possibly does not belong to this genus." "Genus LVI. Maera. Anterior pair of feet with a moveable nail; the second pair with a compressed hand and moveable thumb. Peduncle of the antennæ with three joints; the superior antennæ longest." "*Sp.* 1. *Grossimana.*" "*Cancer gammarus grossimanus* of Montagu. *Mæra grossimana*, Leach's MSS." "Genus LVII. Melita. Anterior pair of feet very small; second pair with a compressed hand, and moveable nail which bends on the palm. Superior styles of the tail very long and large." "*Sp.* 1. *Palmata.*" "*Gammarus palmata*, Montagu, *Linnean Transactions*, vol. vii. tab. 6. *Melita palmata*, Leach's MSS." "Genus LVIII. Leucothöe. Anterior feet with a finger and thumb; the thumb jointed; second pair with a moveable thumb but no finger. Peduncle of the antennæ with two joints. Superior antennæ longest." "*Sp.* 1. *Articulosa.*" "*Cancer articulosus* of Montagu. *Leucothöe articulosa.* Leach's MSS." This is now known as *Leucothoë spinicarpa* (Müller) Abildgaard.

Leach then observes that *Phronima sedentaria* of Latreille, "*Cancer sedentarius Forsk. F. Arab.* page 95," probably forms a distinct family, but as he had never seen a specimen, he merely quotes some remarks of Latreille upon it, and then proceeds to give:—

"Family XV. Corophini. Genus LIX. Corophium." "*Sp.* 1. *Longicornes.*" "*Cancer grossipes* of Linné; *Oniscus volutator* of Pallas; *Gammarus longicornis* of Fabricius; *Astacus linearis* of Pennant; and *Corophium longicorne* of Latreille."

"Family XVI. Caprellini," with a note:—"The body of these animals, exclusive of the head, is composed of six joints, all except the second and third bearing feet. The second and third segments furnished on each side with two processes, which probably serve as fins.

Feet ten, all armed with a moveable nail; the anterior pair very small, and originating from the head. Mouth with two jointed palpi, armed at the point with a little hook. The female is furnished with a pouch, situated between the fins, in which she carries about the eggs and her young after their exclusion, until they are enabled to shift for themselves." "Genus LX. CAPRELLA." "*Sp.* 1. *Linearis.*" "Head with one little tubercle. Hand of the second pair of feet with three teeth on the inner edge. *Cancer linearis* of Linné; *Astacus atomos* of Pennant; *Caprella linearis* of Latreille; *Oniscus scolopendroides* of Pallas." This Mayer is unable to identify, but the tridentate hand points pretty clearly to Müller's *Squilla quadrilobata*, Zool. Dan., pl. lvi. figs. 4–6. "*Sp.* 2. *Phasma*," Montagu, Linn. Trans., vol. vii., which is now *Protella phasma*, Montagu. "*Sp.* 3. *Penantis.*" "*Astacus atomos* of Pennant." This has since been identified with *Caprella acutifrons*, Latreille. "*Sp.* 4. *Acanthifera.*" "*Caprella acanthifera*, Leach's MSS." "Genus LXI. PANOPE. Body depressed. Eyes situated on the vertex of the head. Antennæ four-jointed; the upper pair, with the basilar joint, largest; the second and third equal, but rather shorter than the first; apical joint very small; inferior pair also composed of four joints, shorter than the first joint of the upper pair. Feet compressed and armed with strong nails; the anterior pair situated on the base of the head, the wrist jointed. Hands of the second pair armed with teeth on their inner edge. Fins of a leathery-membranaceous substance, cylindrical and elongated. Anus produced, having a few obscure small tubercles on each side and under. The pouch of the female with four valves." "*Sp.* 1. *Ceti.*" "*Oniscus ceti* of Linné; *Pycnogonum ceti* of Fabricius; *Panope ceti*, Leach's MSS." Latreille's authority is quoted for the (erroneous) statement that it attaches itself to fishes of the genus *Scomber*, as well as to whales, but no notice is taken of Latreille's name for the genus, *Cyamus*.

Under "Order III. Myriapoda. Family XVIII. ASELLIDES," upon "Genus LXVI. CYMOTHOA," the observation is made:—"It is highly probable that *Oniscus testudo* of Montagu (*Transactions of the Linnean Society of London*, vol. ix. page 102, tab. 5, fig. 5) is referable to a genus akin to this." Leach having never himself seen the species, merely quotes Montagu's description.

1814. LEACH, W. E.

Article Crustaceology. Appendix. The Edinburgh Encyclopædia. Vol. vii. pp. 429–437. (That the date of this Appendix is not later than 1814 may be inferred from the fact that the genera *Pherusa* and *Proto* appear in it as new, without any reference to the mention of them in the Tabular View read before the Linnean Society in April, May and June of 1814.)

Leach has here "divided the Tribe MILLEPEDA from the Crustacea, and considered them as a distinct class, under the title of MYRIAPODA, and has placed the ONISCIDES and ASELLIDES with the GASTERURI." The two orders Entomostraca and Malacostraca are now considered as subclasses. The three Tribes of the Malacostraca are called orders. The Gasteruri now include seven Tribes called Gnathides, Gammerides, Phronimarides, Caprellides, Apsendides, Asellides, Oniscides. Of these we find that the second, third, and fourth, belong to the Amphipoda. The Tribe Gammerides, answering to the previous Family Gammarini, is thus divided:—"Family I. ORCHESTIDÆ," "Genus 1. TALITRUS," in which Leach has discovered that *Talitrus littoralis* is only the other sex of *Talitrus locusta*; "Genus II. ORCHESTIA."

"Family II. DEXAMERIDÆ. Antennæ three-jointed, the last joint composed of several other minute articulations; upper ones longest," with two sections, "**Two anterior pairs of feet*

monodactyle. Genus III. Dexamine. Four anterior feet nearly equal; hands sub-ovate, compressed and filiform," type species *Dexamine spinosa*, Montagu; "* * *Anterior pair of feet didactyle; second pair monodactyle*. Genus IV. Leucothoe."

"Family III. Gammaridæ. Last joint of the antennæ composed of several minute articulations; upper pair longest, four-jointed; under ones five-jointed," with three sections, "* *Second pair of feet larger than the first, with a compressed hand.* Genus V. Melita," "Genus VI. Maera." "* * *Four anterior feet nearly equal in size and form with ovate hands.* Genus VII. Gammarus." "Genus VIII. Ampithöe. superior antennæ, without a seta at the base of the last joint; back of the tail without fasciculi of spinules." "* * * *Four anterior feet with a filiform hand.* Genus IX. Pherusa," left otherwise without definition, the type species *Pherusa fucicola* receiving this description:—"Colour whitish, nuttled with reddish. Found on the rocky shores of Devon, under stones at low tide, on fuci."

"Family IV. Podoceridæ. Superior antennæ shortest four-jointed, the last joint solid or obscurely articulated; inferior antennæ five-jointed, with the last joint solid, or very obscurely articulated." In the first section, "* *Superior antennæ very short, the last joint composed of many minute articulations*," he places "Genus X. Corophrium [*i.e.*, *Corophium*]"; in the second, "* * *Superior antennæ shorter than the under ones; the last joint scarcely articulated*," he places "Genus XI. Podocerus," "Eyes hemispherical and somewhat prominent; four anterior feet didactyle, anterior pair smallest with an elongate sub-ovate hand; second pair with an ovate hand, and the internal side nearly straight," type-species, *Podocerus variegatus*: "Genus XII. Jassa, eyes not prominent; four anterior feet didactyle with ovate hands; the anterior pair smallest; the hand of the second pair with the internal edge furnished with teeth," with two species, *Jassa pulchella*, var. *α*, var. *β*, and *Jassa pelagica*, both these species being referred to as already established in the genus *Iassa*, Leach, "*Mem. Wern. Soc.* vol. ii." He adds that "*Cancer gammarus falcatus* of Montagu, *Lin. Trans.* vol. ix. tab. 5. fig. 2. seems referable to this genus." Modern opinion groups all the four last-mentioned species under the name *Podocerus falcatus*, Montagu. *Jassa* or *Iassa* would claim priority as the generic name, only that there seems to be nothing in the Mem. Wern. Soc. corresponding to Leach's reference. Tribe III. Phronimarides, only contains the genus *Phronima*. Of Tribe IV. Caprellides, Leach says, "This includes our family Caprellini, to which we can add another genus, differing from *Caprella* in having true legs instead of the gelatinous fine [fin]-like legs, which is named Gen. Proto. Sp. 1. *Pedata. Cancer gammarus pedatus*, Montagu, *Linn. Trans.* vol. xi. p. 6. tab. ii. fig. 6." This is *Proto ventricosa*, O. F. Müller.

1814. The Entertaining Magazine; or, Repository of General Knowledge, &c. By the Most Celebrated Modern Authors. Vol. II. London. Preface dated Dec. 31, 1814.

The Article "Animal Biography" concludes in July 1814, on page 354, with giving in Class V., Insecta, "Order VII. Aptera, or insects without wings. The genera are:—1. *Podura*, spring-tail. 2. *Pediculus*, louse. 3. *Pulex*, flea, chigger. 4. *Acarus*, tick, mite. 5. *Aranea*, spiders. 6. *Scorpio*, Scorpion. 7. *Cancer*, crab, lobster, crawfish, shrimp. 8. *Monoculus*, water-flea. 9. *Oniscus*, wood-louse. 10. *Scolopendra*, centipede." This contribution, "by the most celebrated modern authors," or some one of them, is a high compliment to the enduring influence exercised by Linnæus, whose earliest views on this portion of the animal kingdom are here reproduced, in spite of all that had been done in the interval by his distinguished successors throughout Europe.

1814. Rafinesque-Schmaltz, Constantin Samuel, born 1783, died 1840 (Hagen).

Précis des découvertes et travaux Somiologiques entre 1800 et 1801, ou choix des principales découvertes en zoologie, et en botanique. Palerme, 1814.

Somiologie is explained by this eccentric author to mean "la Science des Corps vivans," applying both to botany and zoology, to each of which he assigns ten classes, which he sets one over against the other. The Crustacea are placed in the fifth class, the Plaxolia, in which he had observed about 180 species, nearly half of them new, to be described and figured in his Plaxologie Sicilienne. He describes a new genus *Pisitoe*:—"Antennes nulles, yeux irréguliers, bouche sous la tête, recourbée postérieurement, munie de crochets; Corps à 6 articles et 6 paires de jambes inégales, la quatrième paire la plus grande, queue à 4 articles, les 3 antérieurs à appendices.—Obs. Il appartient à l'ordre *Brangasteria*, et famille *Phronimia*, il diffère particulièrement du *G. Phronima* par son moindre nombre de jambes," with the species, "*Pisitoe bispinosa*, Front à deux épines antérieurement, les trois premières paires de pattes à un seul ongle," and "*Pisitoe levifrons*. Front lisse, sans épines, les trois premières paires de pattes à deux ongles." Boeck thinks that this genus may be the same as *Phrosina*, Risso. Costa makes *Pisitoë levifrons* a synonym of *Phronima sedentaria*, and regards *Pisitoë bispinosa* as equivalent to Risso's *Phrosine semilunata*, though apparently not thinking it right to displace Risso's name in favour of Rafinesque's inaccurately described genus and species.

1815. Tilesius von Tilenau, Wilhelm Gottlob, born 1769, died 1857 (Hagen).

De Caneris Camtschaticis, Oniscis, Entomostracis et Cancellis marinis microscopicis noctilucentibus. Cum tabulis iv. æneis et appendice adnexo de Acaris et Ricinis Camtschaticis. Auctore Tilesio. Conventui exhibuit die 3 Februarii 1813. Mémoires de l'Académie Impériale des Sciences de St. Pétersbourg. Tom. 5. St Pétersbourg, 1815, pp. 331–405.

This author divides the Crustacea into three orders—1°) *Entomostraca*, "2°) *Astacoidea*, quorum corpus et cauda elongata et crusta calcarea obtectum est," 3°) *Carcinoidea* seu Brachiuri. A note to the *Astacoidea* says, "Palinurus, Astacus, Hippa, Squilla, Gammarus Palæmon Crago Penæus et plura genera ad formandam familiam Astacoideorum microscopicorum vel Arthrocephalorum Dumerillii ad maximam partem noctilucentium marinorum subjungenda, v. g. Caprella Lamarkii, Mysis Latreillii ejusque Phronime vel Cancer sedentarius Forskâlii, Thalitrus Latreillii, Amblyrrhyncotus vel obtusirostris, Erythrocephalus, Acanthocephalus, Anarthrus, Symphysopus et alii, quorum sermo erit in Sectione VIII. de Entomostracis inscripta."

At page 369, section IX. is devoted to the Onisci, in regard to which he prefers the views of Pallas to those of Linnæus. He gives a description of "*Oniscus scolopendroides*, *Pallas*, spicil. Zool. fasc. IX. tab. 4, fig. 15. *Martens*, Spitzb. t. P. f. 1. *a.b.c.* Longitudo digiti transversi, rarissime pollicaris. Corpus filiforme varicosum, septem articulorum, e quibus posteriores sensim minores. Antennæ majores dimidia corporis longitudine, intermediæ sub majoribus dimidio breviores, exiliores. Palpi ad os exiles et prope os brachiola minuta chelifera, qui primum par efficiunt pedum. Ad finem articuli secundi prælongi brachia duo insignia chelis magnis ventricosis instructa. In tertio et quarto articulo utrinque vesicula ovata loco pedum, et in fœmellis ovariorum receptacula foliacea. Articuli posteriores pedibus ambulatoriis instructi in postremo articulo longioribus parva chela

terminatis. Hæc oniscorum species a Cancro lineari atomos et filiformi *Linnæi* vix differt, jam a *Stellero* nostro 1741 in portu divi Petri et Pauli Camtschatico observata et a me in fruticosis Sertulariæ longissimæ et spinosæ fasciculis per ancoræ dentes avulsis, et cum ancora sublatis visa."

1815. Rafinesque-Schmaltz, C. S.

Analyse de la Nature ou Tableau de l'Univers et des corps organisés par C. S. Rafinesque. Palerme, 1815.

In the "Tableau des Classes Somobiques," the Règne Animal is divided into ten classes, of which four belong to the first Sous-Règne, "Zostolia;" the remaining six to the second Sous-Règne, the "Anostia, Anostiens," which have "Point de squelette osseux, ni d'épine dorsale vertébrée, un cerveau ou une moelle longitudinale noueuse centre du système nerveux." The first "Sur-Classe" is the "Condylopia, Condylopes," with "des membres articulès et une tête; jamais de coquille." This contains Class V., the "Plaxolia, Crustacés," with "des Branchies, un cœur et des vaisseaux sanguins," and Class VI., "Entomia, Insectes." He disapproves the classifications of the Crustacea made respectively by Fabricius and Latreille, preferring Lamarck's division of them into Pédiocles and Sessiliocles.

The subclass Sessilioclia he thus defines:—"Yeux sessiles, non mobiles, ou effacés ou un seul ou aucun; tête articulée; ordinairement plus de 10 pattes exongulées et chaque paire inserée à un article." He includes in it the orders "4, Ostracinia," "5, Pseudopia," "6, Branchypia." The sixth order, "Branchypia, Les Branchypes" contains the following:—

"14. Famille. Phronimia. Les *Phronimiens.* Deux antennes ou aucunes, quelques pattes chéliformes ou pincifères.

"1. S. F. Elaphalia. Les *Elaphales.* Point d'antennes. G. I. *Callirhoe* R. (*Heterelos* R.) 2. *Pisitoe* R.

"2. S. F. Cerophalia. Les Cérophales. Deux antennes. G. 3. *Phronima* Foskael. 4. *Cerophas* R. 5. *Protonia* R.

"15. Famille. GAMMARIA. Les *Gammariens.* Quatre antennes, quelques pattes chéliformes ou pincifères, corps ordinairement cylindrique ou comprimé, la tête plus longue du dernier article caudal.

"1. S. F. Talatridia. Les Talitrides. Queue terminée par des appendices ou soies. G. I. *Talitrus* Bosc. 2. *Corophium* Latr. 3. *Gammarus* Fabr. 4. *Asope* R. sp. do. 5. *Plexaura* R. sp. do. 6. *Hippias* R. sp. do. 7. *Cychreus* R. sp. do. 8. *Steryolus* R. sp. do. 9. *Pephredo* R. sp. do. 10. *Dinoa* R. sp. do. 11. *Thiella* R. 12. *Aglaura* R. 13. *Isolus* R. 14. *Eratea.* 15. *Zacoreus* R.

"2. S. F. Cyamidia. Les *Cyamides.* Queue sans appendices ni soies. G. 15. *Caprella* Lam. 16. *Cyamus* Latr.

"16. Famille. ONISCIA. Les *Oniseiens.* Quatre antennes, quatorze pattes, dont aucunes chèliformes ni pincifères, corps déprimé, le dernier article de la queue plus long que la tête et à appendices articulés.

"1. S. F. Asellota. Les *Asellotiens.* Quatre antennes très-apparentes. G. 1. *Asellus* Geofr. 2. *Idotea* Fabr. 3. *Sphæroma* Latr. 4. *Cymothoa* Fabr. 5. *Tyronia* R. 6. *Primno* R. 7. *Psamathe* R.

"2. S. F. Lygidia," in which all the genera mentioned are Isopods, as indeed also are those under Asellota, although *Cymothoa* at one time included *Cyamus* and the name *Primno* was subsequently used by Guérin for one of the Hyperina.

It will be understood that the letters S. F. stand for sous-famille, R. for Rafinesque, G. for genre or genus.

1815. Leach, W. E.

The Zoological Miscellany; being Descriptions of new, or interesting Animals, by William Elford Leach. Illustrated with coloured figures, drawn from nature, by R. P. Nodder. Vol. ii. London, 1815.

On page 21 Leach defines the new genus *Atylus*;—"*Antennæ* 4-articulatæ segmento ultimo e plurimis articulis minutis efformato; *superiores* sub-breviores articulo secundo tertio longiore; *inferiores* articulo secundo tertio sub-breviore. *Oculi* sub-prominentes rotundati inter antennas in capitis processum inserti. *Pedes* 14; paria 1 et 2 monodactyla manu parvula, compressa, 3, 4, 5, 6 et 7 ungue simplici instructa. *Cauda* utrinque stylis duplicis tribus et superne stylulo utrinque mobili instructa. Corpus (capitê includente) 12-articulatum." Stylis duplicis tribus is translated "with a triple series of double styles," and (capitê includente), "(including the head)." The type species *Atylus carinatus* is figured the natural size, and the description is taken from the specimens of *Gammarus carinatus* described by Fabricius, Ent. Syst. 2. 515. 3, so that Leach feels justified in correcting that author's statement that the hands are simple, "G. manibus adactylis." On page 23 the genus *Dexamine*, already established in the Edin. Encycl., vol. vii. p. 432, is here more fully characterised:—"*Antennæ* triarticulatæ segmento ultimo e plurimis articulis minutis efformato, segmento primo secundo breviore; *superiores* longiores. *Oculi* oblongi haud prominentes pone antennas superiores inserti. *Pedes* 14; paria 1 et 2 monodactyla manu parvula, compressa, 3, 4, 5, 6 et 7 ungue simplici instructa. *Cauda* utrinque stylis duplicis tribus, superneque stylo utrinque mobili instructa. *Corpus* (capitê includente) 12-articulatum." The type-species is Montagu's "Cancer *Gammarus* spinosus," now *Dexamine spinosa*.

1815. Leach, W. E.

A Tabular View of the external Characters of Four Classes of Animals, which Linné arranged under Insecta; with the Distribution of the Genera composing Three of these Classes into Orders, &c., and Descriptions of several New Genera and Species. The Transactions of the Linnean Society of London. vol. xi. Part the Second, mdcccxv. pp. 306–400. (Read April 19, May 3, and June 1, 1814.)

He here proposes to include in a new class the *Syngnatha* and *Chilognatha* of Fabricius [the Myriapoda], which Latreille and Lamarck had arranged with the Arachnides. He therefore distinguishes into four classes the Crustacea, Myriapoda, Arachnides and Insecta. The Crustacea with "Branchiis pro respiratione," form two subclasses, the Entomostraca and the Malacostraca; to the latter he unites the Tetracera, which Latreille had placed with the Arachnides, and divides the subclass into two Legions, the Podophthalma and the Edriophthalma, the latter being defined as having "oculi sessiles." This Legion comprises three sections, the first with "corpus lateraliter compressum. Pedes 14. Antennæ 2 in frontem insertæ, unâ utrinque. (Cauda stylis instructa)," one genus. The second section has "corpus lateraliter compressum. Pedes 14 coxis lamelliformibus. Antennæ 4 per paria insertæ. (Cauda stylis instructa)." It includes five divisions with thirteen genera. The third section has "corpus depressum. Antennæ 4. Pedes 14." with four groups, seven divisions and twenty-four genera, the first division with two subdivisions and three genera belonging to the Amphipoda.

Sectio I. contains only "Gen. Phronima, Latr.," which is fully described, and has "Spec. 1. *Phronima sedentaria*."

Sectio II. has the following arrangement: "Divisio I. *Antennæ* 4-articulatæ, articulo ultimo e plurimis segmentis minutis efformato; *superiores* brevissimæ, inferiorum pedunculo breviores." Gen. 2. TALITRUS, *Latr.*, *Bose*. *Pedes* quatuor antici in utroque sexu subæquales, monodactyli. *Antennæ* superiores articulis duobus inferiorum basilaribus breviores. "Spec. 1. *Talitrus locusta*." "Gen. 3. ORCHESTIA," Leach's own genus re-defined:—"*Pedum* paria quatuor antica MARIS monodactyla, pari secundo manu compressâ magnâ; FŒMINÆ pari antico monodactylo, secundo didactylo. *Antennæ* superiores articulis duobus basilaribus inferiorum haud longiores. Spec. 1. *Orchestia littorea*."

"Divisio II. *Antennæ* quadriarticulatæ, articulo ultimo e segmentis plurimis aliis distinctis efformato; superioribus subbrevioribus. Gen. 4. ATYLUS," with the observation, "Generi Dexamini valde affine est hoc genus," and "Spec. 1. *Atylus carinatus*," Fabr.

"Divisio III. *Antennæ* triarticulatæ, articulo ultimo e plurimis aliis distinctis confecto, superioribus longioribus. Gen. 5. DEXAMINE." Spec. 1. *Dexamine spinosa*; "Gen. 6. LEUCOTHOË." Spec. 1. *Leucothoë articulosa*.

"Divisio IV. *Antennæ* 4-articulatæ, articulo ultimo e plurimis articulis efformato; *superiores* longiores. Subdivisio I. *Pedum par secundum maris manu dilatatâ compressâ*. Gen. 7. MELITA." Spec. 1. *Melita palmata*; "Gen. 8. MAERA." Spec. 1. *Maera grossimana*. "Subdivisio 2. *Pedum paria duo antica in utroque sexu monodactyla conformia*. Gen. 9. GAMMARUS, *Antennæ* superiores ad basin articuli quarti setâ parvulâ articulatâ instructæ. *Cauda* superne fasciculato-spinosa. * *Cauda stylis geminatis superioribus stylo supero brevissimo*. Spec. 1. *Gammarus aquaticus*. G. processu inter antennas obtuso rotundato," with the synonym "Gammarus Pulex. *Leach, Edin. Encycl.* vii. 402–432." "Spec. 2. *Gammarus marinus*. G. processu inter antennas subacuminato." "** *Cauda stylis geminatis superioribus stylis subæqualibus*. Spec. 3. *Gammarus Locusta*." Spec. 4. *Gammarus Campylops*;" "Gen. 10. AMPITHOË." Spec. 1. *Ampithoë rubricata*; "Gen. 11. PHERUSA." *Antennæ* superiores setâ nullâ ad articuli quarti basin. *Cauda* superne haud fasciculato-spinosa. *Manus* filiformes," a definition which differs from that of *Ampithoë* only in the substitution of filiformes for ovatæ. The type-species, *Pherusa fucicola*, is still only described by its colour, which, according to Leach's own rendering of his Latin, is "testaceous-cinereous, or gray-cinereous, mottled with reddish."

"Divisio V. *Antennæ* 4-articulatæ, inferiores longiores, pediformes. (*Pedes* quatuor antici monodactyli.) Subdivisio 1. *Pedum par secundum manu magna*. Gen. 12. PODOCERUS." Spec. 1. *Podocerus variegatus*; "Gen. 13. JASSA." Spec. 1. *Jassa pulchella*. Var. α. manu secundâ dente elongato, obtuso ad interni lateris basin. Var. β. manu secundâ latere interno tridentatâ; Spec. 2. *Jassa pelagica*, and the observation, "Gammarus falcatus, *Montagu, Trans. Linn. Soc.* ix. ad hoc genus pertinere videtur." Subdivisio 2. *Pedum par secundum manu haud magnâ*. Gen 14. COROPHIUM. *Latr.*, Spec. 1. *Corophium longicorne*.

"Sectio III. *Corpus* depressum. A. *Cauda inermis*. Divisio I. *Corpus* 6-articulatum, segmentis omnibus cum capitis basi pedigeris. *Pedes* 14; *paria duo antica* ungue mobili, (pollice) instructa; *par anticum* minus, ad caput annexum, carpo articulato; *paria tertium* et *quartum* sæpius spuria; *paria sex posteriora* coxis aliquot productis, *unguibus* validis armata. *Antennæ* quatuor, superiores longiores. *Os* palpis duobus apice ungulatis. *Anus* tuberculis parvis obscuris. *Bursa* (*uterus externus*) valvulis imbricata inter fœminæ pedum paria tertium et quartum sita est, quâ ova, pullique post exclusionem educantur. Animalia parasitica in Oceano degentia, Fucis, Cetaceis (Piscibusque ?) arcte affigentia. Subdivisio 1. *Corpus lineare. Oculi pone antennas superiores siti. Antennæ 4-articulatæ, superiores segmento ultimo aliorum longitudine, e plurimis aliis compositis: inferiores subcompressæ, superioribus dimidio minores. Pedum par anticum* (*Palpi* Montagu) *os prope situm: secundum manu sæpiùs intus dentatâ*." Gen. 15. PROTO. *Pedum* paria secundum, tertium et quartum basi appendiculata. *Pedes* omnes validè unguiculati. Ad hoc genus pertinet

Squilla polata, forte etiam *ventricosa?* Mülleri." "Gen. 16. CAPRELLA." with the note, "ad hoc genus *Astacus atomos*, Pennant, *Squilla lobata*, Müller, et *Cancer Phasma* Montagu pertinent," but Leach declines to disentangle the confused synonymy.

"Subdivisio 2. *Corpus latum, Oculi in verticem siti. Antennæ 4-articulatæ, superiores longiores, articulo basilari paulo majore, secundo tertioque æqualibus basilari paululum minoribus, ultimo minuto penultimo quadruplo minore; inferiores articulo basilari superiorum breviores articulo ultimo minuto. Pedes compressi valide unguiculati; paria duo antica pollice instructa; par anticum minimum ad capitis basin adnexum, carpo articulato, secundum majus manu intus dentata, tertium et quartum coriaceo-membranacea, cylindrica, elongata, spuria. Anus productus, tuberculis obscuris parris. Bursa (uterus externus) valvulis quatuor imbricata.*" Gen. 17. LARUNDA, with *Cyamus*, Latreille, Lamarck, and *Panope*, Leach, for synonyms. *Larunda ceti*, the only species.

There are thus no new genera properly speaking in this paper, but Leach probably regarded those which had just been instituted by him in the appendix to his Article Crustaceology in the Edinburgh Encyclopædia as practically new. These are *Dexamine*, *Ampithöe*, *Pherusa*, *Podocerus*, *Jassa*. In the Encyclopædia he refers to Mem. Wern. Soc., vol. ii., for *Jassa*, but apparently by mistake, as the genus does not appear in that volume, and the reference is not repeated in the Linnæan Transactions. *Atylus* was instituted in the Zoolog. Misc., vol. ii. *Proto* appears here as a new genus, or at least without reference to any previous work. It appears indeed in the appendix above-mentioned, but that appendix may have been in fact contemporaneous in its production with the present "tabular view."

Leach does not give any reasons for rejecting the earlier name *Cyamus*, Latreille, or his own *Panope*, in favour of *Larunda*. *Panope* he may have thought too near to *Panopea* or *Panopæa* employed among Mollusca in 1807. *Cyamus* he perhaps rejected as a name already employed in botany, but Lütken points out that, so far as the Linnæan era is concerned, its zoological use takes precedence of the botanical.

1816. LEACH, W. E.

Annulosa. Encyclopædia Britannica. Supplement., pp. 401–453.

The Annulosa are explained to comprehend five classes—Crustacea, Myriapoda, Arachnides, Insecta, Vermes. The Crustacea are distinguished as having "Branchiæ or gills for respiration. Legs for motion." By "legs" are meant "those organs which actually perform the functions of legs." A review is given of the earlier systems of classification for the Crustacea, concluding with that adopted by Leach himself in the Linnean Society's Transactions, vol. xi. part 2, which was read in 1814, and published in 1815. This system is here repeated, in English instead of in Latin, but otherwise as far as the Amphipoda are concerned, practically unaltered; two or three immaterial observations are added, and in Section III., the definitions of Divisio I. and its two subdivisions are omitted. In both papers *Phronima* is sometimes spelled *Phronyma*, and in the English notes on *Phronima sedentaria* Leach observes that "all authors have erred in giving but ten legs to this animal." This is unjust to Forskål who attributes to the species "pedes utrinque decem: paria enim septem thoracis septem articulis adhærent." To *Gammarus pulex* of his earlier work, Leach, in this and the preceding paper, gives the name *Gammarus aquaticus*, as a new species distinct from the *Gammarus pulex* of Latreille and Bose, arguing from their borrowed figures, which represent the hands much dentated within. That, however, is very little to the purpose, since their figures are only taken from Rösel's *Squilla fluviatilis* without regard to the creature described. On Plate XXI., *Melita palmata*, *Pherusa fucicola*, and *Larunda ceti* are figured.

1816. Savigny, Maria Jules-César Lelorgue, born 1777, died 1851 (Hagen).

Mémoires sur les Animaux sans vertèbres. Première partie. Description et Classification des animaux invertébrés et articulés, connus sous les noms de Crustacés, d'Insectes, d'Annélides, &c. Premier fascicule. Mém. 1–2. Théorie des organes de la bouche des Crustacés et des Insectes. *Insecta*, Linn. A Paris. Janvier 1816.

Savigny tells us in the preface that he based his theory on the examination of some 1500 species of insects and crustacea, most of them scarcely four or five lines in length, and some far smaller. These were carefully dissected, and complete descriptions drawn up and accurate drawings made of the organs of nutrition, motion, sensation, respiration, &c.

The theory in brief is, that whatever form of mouth the insects may take, it is always composed of the same elements. In the second mémoire he divides the Insecta of Linnæus into two classes, 1. insectes *Hexapodes*, which in the perfect state never have more than six feet attached to the first three rings of the body, including all the winged insects with "la Puce, le Pou, le Ricin, les Forbicines, les Podures," the latter two more doubtfully added; 2. insectes *Apiropodes*, with more, sometimes many more, than six feet, including "les Entomostracés, les Crustacés, les Pycnogonum, Scorpions, Araignées et autres insectes sans antennes, les Scolopendres, les Iules." He shows that in the mouth of the crab are to be found the elements which constitute the mouth of the Hexapod insect, but in addition other elements which must of necessity be analogous to the six feet of the Hexapods. All doubt on this point, he says, is removed by what we find in *Gammarus*. This, like the crab, has two compound eyes, four antennæ, a large upper lip, a tongue deeply bifid (the labium inferius), two mandibles, two first maxillæ, two second maxillæ free, not forming together a lower lip. Behind these second maxillæ are not found six auxiliary maxillæ as in the crab, but two only united at the base and exactly imitating a lower lip surmounted by its two palps. But these palps are armed with strong hooks or nails. After them come not ten but fourteen feet, four more than in the crab, a number just equal to the auxiliary maxillæ which *Gammarus* has fewer than the crab. In truth, he says, all Crustacea properly so-called have sixteen feet, of which more or fewer are converted into auxiliary maxillæ. He noticed that in removing the head from some of the smaller Crustacea, the *Cymothoæ* for example, the maxillipeds remain attached to the first ring of the body. This I have found with some of the Amphipoda.

The mistake which Fabricius made in placing in the same genus the *Pycnogonums* without antennæ, and the *Cyami* which have four, Savigny attributes to the real relations "in the habitation, mode of life, and above all, the general form of body of these parasitic insects." But in a note he says, "les Pycnogonum ne sont point parasites à la manière des Cyames. Il parait qu'ils s'attaquent principalement aux coquillages bivalves." In comparing *Cyamus*, a close relation of the Gammari, with *Nymphon* of the Pycnogonum family, Savigny hopes to show how Nature passed from the mouth of the Crustacea to that of the Arachnides. He states that the head of *Cyamus* is "pourvue de gros yeux composés," and in describing the eyes of *Nymphon*, "tres-petits, lisses et groupés près de la tête sur le dos," he adds "ce qu'il y a de singulier, c'est qu'on trouve aussi deux petits yeux lisses au Cyame. Ce sont même les seuls que les naturalistes aient aperçus." The singularity, however, is on the part of Savigny, who, Lütken says, introduced the fiction of the large compound eyes. He does not figure them either in the upper or under view which he gives of the animal. In the "Rapport fait à la première Classe de l'Institut," by the "commissaires MM. Cuvier, de Lamarck et Latreille, rapporteur," Savigny's mistake was accepted without question, to

judge by the quotation he gives from it on page 72, "On n'avait encore aperçu que les deux petits yeux lisses des Cyames, et M.S., en découvrant les yeux ordinaires ou composés, nous montre un fait dont nous n'avions pas encore d'exemple parmi les Crustacés, et qui indique un nouveau rapprochement des Cyames avec les Arachnides sans antennes."

In Plate IV. "*Gammarus . . . . Cymadusa filosa*," n.s., now called *Amphithoë filosa*, and "*Gammarus . . . . Lycesta furina*," n.s., now called *Leucothoë furina*, are figured in part; and on Plate V. *Cyamus ceti*, Latreille, which is *Cyamus mysticeti*, Lütken. In the description of details it may be noticed that the lower lip or labium is called *langue*, the maxillipeds lèvre auxiliaire, and to the six free joints of the legs are given the designations, 1. hanche, 2 and 3. cuisse, 4 and 5. jambe, 6. tarse.

1816. Pollini, Ciro.

Viaggio al Lago di Garda e al Monte Baldo in cui si ragiona delle cose naturali di quei luoghi aggiuntovi un cenno salle curiosita del Bolca e degli altri monti Veronesi. In Verona, 1816.

He remarks, pages 22, 23, "Oltre del Gambero comune, *Cancer Astacus*, rinvengonsi al nostro Lago due granchietti. L'uno è il *Cancer Squilla* (Gamberozoli volg.), che abita infra l'erbe palustri tanto del Benaco, quanto delle risaje nostre, ed è la varietà a rostro dritto. L'altro è il *Cancer Pulex* (Salterello volg.); ritrovasi nel greto a quattro dita, dove si moltiplica prodigiosamente. Dalla sua bocca esce un umore corrosivo, alto a sciogliere la terra. E poichè nelle ore calde suole escire dal covacciolo, reca sommo danno alle tele di lino e di canape, che si stendono dai benacensi ad ascingare ed imbiancare sulla spiaggia, mentre le foracchia di mille modi con l'umore onde si prepara l'alimento. Fu scoperto anche in alcuni pozzi di Verona, e nelle terme di Caldiero." G. D. Nardo, in 1868, states that the "Gambarozzolo" is *Anchystia palustris*, Heller, but of the *Cancer pulex* so destructive to linen on the beach, when it issues from its burrows in the heat of the day, he gives no explanation. It may be conjectured that this burrower is one of the Orchestidæ, and that when Pollini speaks of its being found also in wells and warm springs, he is confounding it with other Amphipods, such as *Niphargus putcanus* and *Gammarus pungens*.

1816. Blainville, Marie Henry Ducrotay de, born 1778, died 1850 (Hagen).

Prodrome d'une nouvelle distribution systématique du régne animal. Bulletin des Sciences, par la Société Philomatique de Paris. Année 1816, Paris, pp. 105 [113]–124.

De Blainville declares his object to be to group animals "d'après l'ensemble de leur organisation." For the purposes of his system, he says, "Je suis arrivé à mettre en première ligne la disposition des différentes parties ou la forme générale des animaux, ce qui se trouve concorder avec celle du systême-nerveux quand il existe. Puis l'organe qui soutient cette forme ou la peau et ses annexes. Après cela les appendices qui s'y ajoutent, et s'y développent. Enfin, les différentes modifications et combinaisons de ces modifications des appendices, c'est-à-dire des organes des sensations, de la locomotion, dans ses différentes espèces, de la mastication, et jusqu'à un certain point de la respiration."

In the Tableau Analytique he divides "ANIMAUX" into "Ier Sous-règne *Pairs* ou Artiomorphes. IIe Sous-règne *Rayonnés* ou Actinomorphes. IIIe Sous-règne sans forme régu-

lière ou Hétéromorphes." The first subkingdom is again divided into "Type I. Vertébrés ou Ostéozoaires. Type II. Invertébrés ou Anostéozoaires." This second type has three subtypes, Ier Sous-type. non-articulés; Mollusques Malacozoaires. IIe Sous-type. Sub-articulés ou Sub-Entomozoaires. IIIe Sous-type. Articulés à Append. Entomozoaires." The second of these contains Classe VIII. Polyplaxiphores. Classe IX. Cirrhipodes. For the third subtype the following Table is given :—

Cl. X.–XVII. INSECTES ET VERS. *A. Articulés, Entomozoaires.*

Entomozoologie ou Entomologie.
Entomologistes.

ENTOM. à anneaux du corps.

- Munis d'appendices.
  - Articulés ou de pieds en nomb.
    - Plus petit que les anneaux.
      - Classe Ire. 6 pieds Hexapodes ou Insectes.
        - Sous-Cl. Ire. Tétraptères,
        - Sous-Cl. II. Diptères.
        - Sous Cl. III. Aptères.
      - IIe. 8 pieds Octopodes ou Arachnides.
      - IIIe. 10 pieds Décapodes ou Crustacés.
        - Sous-Cl. I. Acères.
        - Sous-Cl. II. Tétracères,
          - Thoraciques,
          - Athoraciques.
      - IVe. Pieds var. Hétéropodes.
        - Sous-Cl. I.
        - Sous-Cl. II.
      - V^e^. 14 pieds Tétradécapodes.
        - Sous-Cl. I. Les Tétracères.
        - Sous-Cl. II. Les Epizoaires.
    - Egal aux anneaux du corps.
      - VIe. Myriapodes.
  - non articulés, . . . VIIe. Sétipodes ou Annélides.
- Sans appendices latéraux, ... VIII. Apodes.
  - Sous-Cl. I. Les Sang-sues.
  - Sous-Cl. II. Les Entozoaires.

Ord.

- Classe Ire. 6 pieds Hexapodes ou Insectes.
  - Sous-Cl. Ire. Tétraptères,
    - Lépidoptères.
    - Coléoptères.
    - Orthoptères.
    - Hémiptères.
    - Névroptères.
    - Hyménoptères.
  - Sous-Cl. II. Diptères.
  - Sous Cl. III. Aptères.
- IIe. 8 pieds Octopodes ou Arachnides.
- IIIe. 10 pieds Décapodes ou Crustacés.
  - Sous-Cl. I. Acères.
  - Sous-Cl. II. Tétracères,
    - Thoraciques,
      - Brachyures.
      - Macroures.
    - Athoraciques.
- IVe. Pieds var. Hétéropodes.
  - Sous-Cl. I. . . . . Branchiopodes.
  - Sous-Cl. II. . . . . Squillaires.
- V^e^. 14 pieds Tétradécapodes.
  - Sous-Cl. I. Les Tétracères.
    - Crevettines.
    - Aselles.
    - Cloportes.
  - Sous-Cl. II. Les Epizoaires.
- VIe. Myriapodes.
- VIIe. Sétipodes ou Annélides.
- VIII. Apodes.
  - Sous-Cl. I. Les Sang-sues.
  - Sous-Cl. II. Les Entozoaires.

In the notes, he says, "Dans cette nouvelle distribution des animaux articulés, qui fait le sujet d'un Mémoire communiqué à M. Latreille, le 19 Juin 1815, et lu à la Société philomatique le 24 du même mois, on voit que le principe a été de ne tirer les caractères que des organes de la locomotion, ou mieux, de la combinaison des différentes espèces d'appendices dont peut être accompagné chaque anneau du corps." Note 4, to les Epizoaires, says, "Cette sous-classe, dont j'ai fait le sujet d'un travail particulier, contiendra, outre les Lernées et plusieurs genres nouveaux que le Dr. Leach et moi avons cru devoir établir, les Calyges, Cyames, Chévrolles, etc., de manière à passer insensiblement aux Tetracères."

1816. Blainville, M. H. D. de.

Sur une nouvelle distribution des classes des Crustacés, *des* Myriapodes, *et des* Arachnides; *par le docteur* Williams Elford Leach. Bulletin des Sciences, par la Société philomatique de Paris. Année 1816, Paris.

This is merely a report of Leach's paper in the Linnean Society's Transactions, as the title intimates.

1816–1817. LATREILLE, P. A.

Nouveau Dictionnaire d'histoire naturelle, appliquée aux arts, à l'Agriculture, à l'Économie rurale et domestique, à la Médecine, &c. Par une Société de Naturalistes et d'Agriculteurs. Nouvelle Édition. A Paris. M DCCC XVI. (Thirty-six volumes, of which the first seven belong to 1816, the remainder to 1817, 1818, 1819. The Crustacea are by Latreille.)

In the first volume, pp. 467–469, Latreille institutes the order of Amphipoda, with the following divisions:—

I. *Deux antennes.* Le genre PHRONYME. II. *Quatre antennes.* A. *Les quatre antennes presque semblables pour la forme; les inférieures, n'imitant pas des espèces de pieds.* a. *Antennes supérieures plus longues que les inférieures.* Les genres CREVETTE, MÉLITE, PHÉRUSE, DEXAMINE, LEUCOTHOÉ. b. *Antennes supérieures plus courtes que les inférieures.* ATYLE, ORCHESTIE, TALITRE. B. *Antennes inférieures en forme de petits pieds.* Les genres COROPHIE, PEDOCÈRE. *Voyez* aussi: AMPHITHOÉ, JASSE, MERA.

In the fifth volume under "Chevrolle, *Caprella*, Lam.," Latreille refers to the genus "*Proton*," as containing "les espèces qui ont dix pieds attachés successivement par paires, et sans discontinuité, à autant d'anneaux," while "le genre des Leptomères" contains the species "où les pieds sont au nombre de quatorze." Of *Caprella* he makes two groups:—

"I. *Tête orale point ou peu rétrécie postérieurement*," containing *Caprella acutifrons*, Leach, and *Caprella acuminifera*, thus described:—"Les quatre antennes presque sans cils; corps ayant en dessus de petits tubercules pointus; premier segment renflé, en forme de nœud, vers son extrémité postérieure, à l'insertion de la seconde paire de pieds, avec deux tubercules en dessus; les pieds allongés, avec leur serre échancrée en forme de croissant et armée d'une forte dent en dessous; leur doigt ayant aussi une dent au même côté. Je l'ai reçue de M. Leach sous le nom d'*acuminifera*." This is probably *Caprella acanthifera*, Leach.

Group "II. Tête allongée et rétrécie postérieurement" contains *Caprella linearis*, Linn., and *Caprella mantis*, n. sp., thus described:—"La seconde paire de pieds est plus courte; ses articles inférieurs sont comprimés et anguleux; leurs fesses ont à leur base et a l'extrémité opposée, une dent assez forte; on en distingue une troisième, mais plus petite, sous celle de bout. Sur nos côtes baignées par l'Océan."

He adds that "il faut encore rapporter à ce genre le *cancer filiformis* de Linnaeus. Forskaël en a décrit une autre espèce, comme une larve d'un genre incertain, *Faun. arab.*, pag. 87."

In the eighth volume the article Crustacés extends from p. 487 to p. 494. It contains a brief history of Carcinology, and definitions of the five orders into which Latreille at this epoch divided the class. The situation and form of the branchiæ, the manner in which the head articulates with the trunk, and the masticatory organs, have, he says, furnished the principal characters for his classification. He explains the name Amphipoda, which he gives to the third order (see Glossary). He supposes them to have two kinds of branchiæ, the one set vesicular, placed at the inside of the base of the leg, the other set setaceous, under the tail ("en forme de poils ou de soies, annexés à des espèces de fausses pattes, situées sous la queue").

The article "CYSTIBRANCHES, *Cystibranchia*, Latr.," receives what are now called the Caprellina as a "section des crustacés, de l'ordre des isopodes," but distinguished from other Isopods by so many characters that Latreille thinks they might well form a separate order. Hence in the seventeenth volume, 1817, we find the article "LEMODIPODES, *Læmodipoda*. (Gorge à deux pattes.) Ordre de crustacés qui, dans l'ouvrage de M. Cuvier, sur le Règne animal, compose la section des *cystibranches* de l'ordre des isopodes, mais que j'en ai ensuite séparée

pour en former un ordre special. Ses caractères ont été développés à l'article CYSTIBRANCHES. V. ce mot." Already to the article on the Isopods, his fourth order, he had appended a note, "On pourroit former un ordre particulier, sous le nom de *læmodipodes* (*læmodipoda*), des *isopodes cystibranches*. Leurs quatre mâchoires sont disposées sur le même plan transversal, en forme de lèvre, comme celles des myriapodes; la première paire de pieds proprement dits est annexée à la tête; ils n'ont point de branchies sous la queue; de petits corps vésiculeux, analogues à ceux qu'on voit à la base des pieds des amphipodes, paroissent en tenir lieu."

These *Læmodipodes*, he thinks, lead towards the Myriapods or the Pycnogonides.

Throughout the work the various genera of Amphipoda and Læmodipoda accepted at this period are discussed in the alphabetical order of their French names, but without, so far as I have seen, any novel information being contributed. In most instances the French and Latin names begin with the same letter, but *Gammarus* is an exception, being in French Crevette or Chevrette. Of the "CREVETTINES, *Gammarinæ*," Latreille says, "J'ai, dans mes ouvrages précédens sur l'entomologie, désigné sous ce nom une famille de crustacés composée de ceux qui forment aujourd'hui l'ordre des *amphipodes* et la division des *isopodes*, que j'appelle *Cystibranches*."

1816. RISSO, A., born 1777, died 1845 (Hagen).

Histoire naturelle des Crustacés des environs de Nice. Par A. Risso. Ornée de gravures. A Paris, 1816.

Risso begins with a quotation from Cuvier, "La détermination précise des espèces, et de leurs caractères distinctifs fait la première base sur laquelle toutes les recherches de l'Histoire Naturelle doivent être fondées," &c. Risso's own intention, doubtless, was to act in accordance with this maxim. Nevertheless, the species he established have in several cases caused great perplexity, owing in part, perhaps, to the want of repeated researches in those localities in which Risso's specimens were taken. In discussing the habitations of Crustacea, he regards *Talitrus* as amphibious, delighting in the rocks; *Caprella* (les chevrolles) hides under stones covered with fucus; *Cyamus* attaches itself to cartilaginous fishes; *Phronima* floats on the surface, leaps lightly out, or penetrates to small depths below. *Typhis* is found beyond the Zostera zone.

He divides the class Crustacés into two orders, the first "Cryptobranches. Tégumens durs; branchies cachées sous le corcelet; yeux pediculés; sans palpes ou antennules; dix pattes foliacées ou mutiques," subdivided into two sections (1) Brachiures, with two families containing between them eleven genera, and (2) Macroures, with three families containing among them seventeen genera; the second, "Gymnobranches. Tégumens coriaces; branchies cachées ou inconnues; yeux le plus souvent sessiles; mandibules palpigeres; dix pattes ou plus; terminées par des crochets," subdivided into three sections (1) "Squillines. Tête distinct du corcelet;" (2) Tétracères; (3) Entomostracés. The Squillines include two families, "Squillares. Queue munie de lames ou de filets, yeux pediculés," with the genera *Squille* and *Mysis;* "Crevettines. Queue avec ou sans appendices foliacés, yeux sessiles," with the genera, "31. Phronime. 32. Typhis. 33. Euphée. 34. Talitre. 35. Crevette. 36. Chevrolle. 37. Cyame." The second section, Tétracères, contains two families, Asellotes and Cloportides, each with six genera; the third section, Entomostracés, contains two families, the Clypéacés with one genus, and the Ostracodes with two genera.

The Isopod *Anceus*, it may be noticed, is here given as a new genus, among the third family, Paguriens, the first of the Macroures. It is, in fact, a synonym of the genus *Gnathia*,

named by Leach in his Article Crustaceology, 1813–1814. Leach himself appears for some unexplained reason to have allowed his genus *Gnathia* to drop, but the name retains its right of priority notwithstanding.

Pages 119 to 132, and Pl. II. figs. 3, 9, are concerned with Amphipoda, arranged as follows:—"Septième Famille. Crevettines. (1) *Antennes n'étant point terminées par des filets.* A. *Queue sans appendices* [which is inconsistent with the descriptions that follow]. G. xxxi. Phronime. *Phronima*, Latr. Les pattes des deux premières paires monodactyles. Latr." Espèces. (1) "P. Sedentaria, Latr." "(2) P. Sentinelle. N. *P. custos*, N. Planch. 2, fig. 3. *P. Corpore lineari, albissimo; pedibus decem, tertio pari longiore æquali, didactylis*, N. Cette phronime a le corps linéaire, cylindrique et blanchâtre. Son corcelet est formé de très-petits segmens. Sa tête est conique, plane sur le devant. Ses yeux sont noirs et sessiles. Ses pattes sont filiformes; la troisième paire est un peu plus longue que les autres et armée de pinces égales, les postérieures sont courtes et grêles. L'abdomen est composé de quatre longs segmens. La queue se termine par une petite plaque qui sert de support à des appendices bifurqués. *Dimens. long.* 0,040. *larg.* 0,004. *Séjour: dans les équorées et geronies. (Genres de méduses).*" This species is, in Claus's opinion, the same as the preceding. "G. xxxii. Typhis. N. *Typhis*. N. Corps arrondi, abdomen plié sous le corcelet dans le repos; pattes de la première paire didactyles; celles des deux dernières en forme de lames avec un ongle crochu à l'extrémité. Espèce. T. Ovoide. N. *T. Ovoides.*

Fig. 18.

N. Planch. 2, fig. 9. Cette espèce ne peut entrer dans aucun des genres connus de la classe des Crustacés. Son corps est ovoide, lisse, d'un beau jaune clair et luisant, parsemé de petits points rougeâtres; sa tête est oblongue, très-large et tronquée sur le devant. Ses yeux sont petits ainsi que ses antennes. Sa bouche est garnie des palpes soyeux. Son corcelet est composé de segmens très-rapprochés, qui sont munis sur leurs bords de lamelles, sur lesquelles les pattes s'articulent. La première paire est presque aplatie, à cinq articles dont le dernier est didactyle: la seconde et la troisième paires sont petites, monodactyles, et les deux dernières, consistent en deux grandes et larges lames terminées par un crochet. L'abdomen est convexe, composé de cinq segmens. Les écailles caudales sont arrondies, ciliées; la pièce du milieu est conique et aiguë." "*Dimens. long.* 0,024. *larg.* 0,012. *Séjour: dans le golfe de Nice.*" This species has been called *Thyropus ovoides* by Spence Bate, and *Eutyphis ovoides* by Claus, but *Dithyrus*, Dana, being the earliest synonym of the preoccupied name *Typhis*, will take precedence for the genus, and the species will be *Dithyrus ovoides*. Risso's own figures are drawn with very fine lines and give the details more clearly than might be supposed from my copies of them.

Risso continues as follows:—"2. *Antennes terminées par des filets.* A. *Queue ayant des appendices.* G. xxxiii. Euphée. N. *Euphens*. N. Corps cylindrique, terminé par de longs filets; pattes de la première paire didactyles." This genus is now generally regarded as belonging to the Isopoda, and its one species, *Euphens ligioides*, as being identical with the earlier *Cancer* (*Gammarus*) *talpa* of Montagu, Leach's *Apseudes talpa*. "G. xxxiv.

Talitre. *Talitrus*. Latr.," contains two species, "1. T. Gammarelle. *T. Gammarellus*, Latr.," which is *Orchestia gammarellus*, Pall., and "2. T. Tacheté de rouge. N. *T. rubropunctatus*. N. *T. Cheli minimis; pedibus secundo pari longissimis apice oratis, ocutis.* Cette nouvelle espèce a le corps comprimé, d'un jaune clair, transparent; composé de dix segmens tâchetés de rouge. Sa tête est presque triangulaire, ses yeux sont réniformes, réticulés; ses antennes supérieures presque aussi longues que les inférieures, avec les deux premiers articles très-gros et fort longs. Le premier de ces inférieures est court et renflé. La première paire de pattes est grêle, courte; la seconde est longue avec leur dernier article ovale, tâcheté de rouge et terminé par un crochet. La femelle porte des œufs blanchâtres, en avril. *Dimens. long.* 0,015. *larg.* 0,004. *Séjour: dans le golfe de Nice.*" This species is not included in the general lists either of Milne-Edwards or Spence Bate, although the latter writer notices *Euone punctata*, which is evidently the same species, renamed but treated as new, by Risso in 1826. That it is not a *Talitrus* may be inferred as well from the description of the antennæ as from Risso's preliminary remark, evidently referring to this species, "une des deux espèces que je vais décrire se tient en pleine mer, et sautille toujours à la surface de l'eau pendant les calmes de l'été." "G. xxxv. Crevette. *Gammarus*. Fabr.," "Espèce. G. Puce, *G. Pullex*. Fab." "Var. A. On trouve des individus coloré d'un rouge pâle au *vallon obscur*." *Pullex* in the errata is corrected to *Pulex*.

After *Gammarus* follows "B. *Queue sans appendices*. G. xxxvi. Chevrolle. *Caprella*. Latr." "Espèces. 1. C. Linéaire. Latr. *C. Linearis*. Latr.," "2. C. Ponctuée. N. *C. Punctata*. N. *C. Pedibus anticis brevibus; secundo tertioque pari longissimis monodactylis*. N." These two species of *Caprella* are given up by Mayer and V. Carus as incapable of determination." "G. xxxvii. Cyame. *Cyamus*. Latr." "Espèce. C. De la Baleine. *C. Ceti* Latr." Of this Lütken thinks that Risso's description is original, though possibly he may have described a northern specimen, and taken for granted that the species occurred in the Mediterranean. After the specific description Risso adds, "Les cyames paroissent présenter les mêmes mœurs et les mêmes habitudes que les caliges. Ces animaux se fixent indifféremment sur les cétacés ou sur les poissons pour se nourrir à leurs dépens. Les thons qui en sont quelque fois atteints paroissent souffrir beaucoup de ces hôtes incommodes, et lorsqu'ils en ont un très-grand nombre, ils sont saisis d'une sorte de fureur qui les porte à sauter très-souvent hors de l'eau. *Dimens, long.* 0,012. *larg.* 0,008. *Séjour: sur les Baleinoptères et les Scombres.*"

1816.–Treviranus, Gottfried Reinhold, born 1776, died 1837 (Hagen).
1817.

Abhandlungen über den innern Bau der ungeflügelten Insekten. Siebente Abh. Die Walfischlaus. (Vermischte Schriften anatomischen und physiologischen Inhalts. Von Gottfried Reinhold Treviranus und Ludolf Christian Treviranus. 2ter Band (1817) S. 3. t. 1.). Göttingen, 1816.

Boeck says that the anatomy of *Cyamus* is given, with figures of the male and female, the mouth-organs, and intestines. The mouth-organs are considered to resemble those of *Oniscus*, but to be simpler in construction. The author was uncertain as to the form of the second maxilla, and could not make out whether the mandibles had a palp or not. The stomach he found to be quite simple, without salivary or biliary duct. To the nerve-cords he attributes seven knots or ganglia; the heart he describes as an organ broad in front, narrow behind. He also describes the cylindrical branchiæ. He considers that the genus may stand in the same family with *Oniscus*, and that it does not belong to *Squilla*, as de Geer, or to *Cancer*

pulex, as Latreille supposed. In full accordance with Boeck's account of this paper, Lütken says that the figure and description given of the exterior of the animal are good, the account of the mouth-organs very incomplete, and the contributions to the knowledge of the internal structure, if on the whole correct, not very far-reaching.

1817. Latreille, P. A.

Le Règne animal, distribué d'aprés son organisation, pour servir de base à l'histoire naturelle et d'introduction à l'anatomie comparée. Par M. le Ch^er^. Cuvier. Avec Figures, dessinées d'après nature. Tome III. contenant les Crustacés, les Arachnides et les Insectes, Par M. Latreille, de l'Academie des Sciences, &c. A Paris, 1817. (pp. 44–53.)

Latreille here divides the class of Crustacea into five orders—Decapods, Stomapods, Amphipods, Isopods, and Branchiopods. In regard to his order of Amphipods, after giving a general description of the structure and habits, he says we might embrace this order under the generic name of Gammarus. He then proceeds to distinguish Les Phronimes (*Phronima*, Latr.), les Chevrettes (*Gammarus*, Lat.), which include, with various characteristics, les *Leucothoés* and les *Dexamine* of Leach, les *Melite*, les *Mærza*, the Chevrettes, properly so-called, or *Gammarus*, les *Pherusa* and les *Amphitoe*, all of Leach, and la *Cherrette des ruisseaux* of Geoffroi. These are followed by les *Talitres* (Talitrus, Latr.), which, he says, Leach subdivides into his *Atyles*, *Talitres*, and *Orchestics*. Finally, les *Corophies* (Corophium, Lat.) are mentioned, with *Cancer grossipes* of Linnæus for the type, and to this group he refers "les *Podocera* et les *Jassa* de M. Leach."

The Isopods he divides into three sections, according to the form and position of the branchiæ. The first section, les Cystibranches (compare page 95), contains the genera *Leptomera*, Latr., and *Proto*, Leach, which are in fact identical, *Caprella*, Lam., and *Cyamus*, Lat., with *Larunda*, Leach, given apparently as an alternative name. In the second section, the Phytibranches, *Typhis*, Risso, is included with other genera usually reckoned as Isopods. The third section, the Pterygibranches, contains only Isopods. In a note on page 7, he recognizes that the branchiæ in *Cyamus*, *Caprella*, and *Proto* were not thoroughly understood, but makes a good guess as to their true position.

1817. Rafinesque-Schmaltz, C. S.

Synopsis of four New Genera and ten new Species of Crustacea, found in the United States. The American Monthly Magazine and Critical Review. Vol. ii. New York, 1817, pp. 40–43.

The portion of this paper apparently referring to the Amphipoda is as follows :—

"III. Psammylla. (N. Order *Branchypia*, N. Family *Gammaria*.) The two upper antens, with two long segments at the base, and many small articles at the top; lower antens very short; all the feet with one nail, the last pair much longer and larger: each segment of the body with a lateral appendage, tail with four bifid unequal filaments.—Obs. The name is abbreviated from Psammopsylla, which means sand-flea. The family *Gammaria* is the fifteenth in my natural classification, and is distinguished by fourteen feet, four antens, body not depressed, etc.

"1. *Psammylla littoralis.* Longer antens doubly than the head, short antens not longer than their first segment; last pair of feet double in length; body rufous above, white beneath.—Obs. I have found this animal in great numbers on the shores of Long-Island and New-York, and on the Hudson river, jumping about like fleas, whence its vulgar name Sand-flea; it jumps by means of its hind feet and tail, like locusts. Length about half an inch, often less; eyes large and round.

"IV. Pephredo. (Natural order and family of the foregoing.) The two upper antens longer and with six long segments; all the feet with one nail, and nearly equal, the two first pairs with thick swelled hands; body without lateral appendages, tail with simple filaments.—Obs. This genus was noticed in my Analysis of nature, and formed on an European species; the name is mythological. It may be deemed a singularity in this family, that this genus should be a freshwater one, and the last a land one!

"1. *Pephredo potamogeti.* Long antens, scarcely longer than the head and double of the short ones; body fulvous, transparent, with a central brown or longitudinal stripe.—Obs. It lives on the *Potamogeton perfoliatum* in the Hudson and the Fishkill, near Newburg. Length three lines, creeper, eyes very small."

Psammylla littoralis is obviously one of the Orchestidæ, a "beach-flea." The upper and lower antens of Rafinesque's terminology would be respectively the lower and upper antennæ of ordinary language. If the two genera *Psammylla* and *Pephredo*, could be identified, they might probably enough fall as synonyms to others already known. It is possible that the acute American observers of the present day will be able to identify the two species here given with some that have been since named.

1817. Say, Thomas, born 1787, died 1834 (Hagen).

On a New Genus of the Crustacea, and the Species on which it is established. Read July 8, 1817. Journal of the Academy of Natural Sciences of Philadelphia. Vol. i. Part 1, No. 4. August 1817. Philadelphia, 1817. pp. 49–52.

The new genus *Cerapus*, assigned to the order Macrouri, is thus defined:—"*Essential Character.*—Thumb of the second pair of feet bi-articulate; interior antennæ four-jointed, exterior ones five-jointed. *Artificial Character.*—Antennæ subequal, interior ones 4-jointed, exterior ones 5-jointed. Two anterior pairs of feet monodactyle, the second pair with a two-jointed thumb. *Natural Character.*—Body semicylindrical, somewhat linear, decreasing towards the tail, ten-jointed. Head distinct from the first joint and larger, quadrate, a little elongated into an angle near the base of the interior antennæ, each side, for the reception of the eyes, which are hardly prominent. Antennæ nearly equal, very large, interior ones with the first joint thick, second and third nearly equal; exterior antennæ five-jointed, the first joint placed in a deep sinus beneath the eye, short, not projecting beyond the margin of the head above, second joint hardly longer than the first, third and fourth equal to the second and third of the interior antennæ. Anterior pair of feet moderate, with a small ovate hand and moveable nail, not closing on the hand, attached to the first segment of the body; second pair with the basal joint attached to the edge of the body (as in Cymothoa, &c.), second joint broad, compressed, with an incisure near the base before, third small, medioliform, carpus cylindrical, narrower than the preceding joint; hand very large, compressed, subtriangular, attached to the carpus by the inferior edge of the acute angle, which is a little curved, tip emarginate and armed with a strong, acute spine on the anterior angle, thumb two-jointed, first joint incurved, linear, second acute, closing on the spine of the hand. Third and fourth pairs of feet equal, similar to each

other, first joint dilated, equal to that of the preceding feet, remaining joints small, nearly equal to each other, submoniliform; two posterior pairs of feet reflected above the back; tail incurved, furnished on each side near the tip with a pedunculated bifid process, and a minute, conic, acute papilla." The type species, *Corapus tubularis*, is further described thus:—"Head with a mucronate carina before; eyes oval, black. Hand and first joint of the thumb of the second pair of feet with one or two obtuse teeth within. Body above blackish, with irregular paler spots; antennæ and feet white, joints tipped with blackish; two hind pairs of feet and tail white. Inhabits a tube. Length about one-quarter of an inch." Say would place it between *Gammarus* and *Caprella*, next to *Jassa* in the family Podoceridæ of Leach. He cannot believe that the tube is fabricated by the Crustacean itself, though he notices that it is always proportioned to the size of the inhabitant, which moves actively with its neatly fitting house, making use of its four antennæ as feet, and deftly turning within its tube, if any impediment is offered to its progress in one direction. It is figured in the following number of the Journal for September, 1817.

1817. STEWART, CHARLES.

Elements of the Natural History of the Animal Kingdom: comprising the characters of the whole genera, and of the most remarkable species, particularly those that are natives of Britain; with the principal circumstances of their history and manners. The second edition. In two volumes. Edinburgh, 1817.

In the preface Stewart says that, as editor, "he has, with Cuvier and others, disjoined the Crustaceous Animals from the Class of Insects, in which they had been included by Linnæus. In vol. ii. p. 308, after the Insects, he places the Class Articulata, containing "two Orders, viz. 1. Crustacea, or those animals which constituted the genus Cancer of Linnæus; and, 2. Arachnides, including the genera Aranea, Phalangium, etc." For this arrangement he gives references to Latreille, Lamarck, and Leach (Edin. Encycl. vol. vii. Crustaceology, and Mal. Pod. Brit. London, 1815. On pp. 316, 317, he gives under *Cancer* the following section or group of species:—

"D. *Antennæ pedunculated and simple.*

"32. Cancer *grossipes*. The claws want the finger; the antennæ the length of the body; the tail obtuse. *Inhabits* the European Ocean. B.—*Pennant British Zool.* 4. *pl.* 16. *f.* 31. The *linearis* of Pennant. Found in the sand on the shore of Flintshire and other places.

"33. Cancer *Pulex*. With four claws which want the finger; ten feet. *Inhabits* Europe. B.—*Degeer, Ins.* 7. *tab.* 33. *f.* 1, 2. This species is very frequent on the shores of the sea; likewise in fountains and rivulets; it swims on its back, and leaps; it causes ulcers on the gills of fishes, and destroys the nets of fishermen; it is eaten by the Avosetta; it shines in the night.

"34. Cancer *Locusta*. With four claws, which want the finger; fourteen feet; the thighs simple. *Inhabits* Europe. B.—*Frisch. Ins.* 7. *tab.* 18. Found very frequently on the sea shore; also in fountains and ditches, swimming on its back, and leaping.

"35. Cancer *Atomos*. Linear; the claws wanting the finger; with eleven feet. *Inhabits* Europe. B.—*Pennant Brit. Zool.* 4. *pl.* 12. *f.* 32. Found in fresh waters; hardly visible by the naked eye; a slender tail between the last pair of feet, makes the eleventh foot; in the middle two pair of oval vesiculæ.

"36. Cancer *lobatus*. Linear; four claws wanting the finger; ten feet. *Inhabits* Europe. B.—*Muller, Zool. Dan. Icones, tab.* 56. *f. inf.* This is the Squilla *lobata* of Muller's Zoologia

Danica; it is found among the confervæ on the sea-shore at Leith; but, perhaps, is not really different from the preceding species."

The two remaining species in the group are "Cancer *salinus*" and "Cancer *stagnalis*," not Amphipoda.

1818. Say, Thomas.

An Account of the Crustacea of the United States. Read June 10, 1818. Journal of the Academy of Nat. Sciences of Philadelphia. Vol. i. part ii. Philadelphia, 1818. pp. 313–319.

Here assigned to Order III. Amphipoda, Latr., is the new genus *Lanceola*, thus described:—"*Essential Characters.*—*Antennæ* four, terminal joints not articulated; *antennæform processes* above the mouth; *caudal styles*, three pairs, peduncle depressed linear, supporting two lanceolate lamellæ. *Natural Character.*—*Body* soft, external covering membranaceous; *head* very short, transverse; *eyes* longitudinal, placed opposite the base of the superior antennæ; *clypeus* projecting into an acute angle; *front* concave; *antennæ* four, unequal, inferiores longest, four-jointed, compressed, basal joints very short, third and fourth longer, equal, the latter entire, superiores abbreviated, compressed, triarticulate, basal joints short, robust, concealed by the clypeus, terminal joint not articulated, linear, compressed, obtuse; *mouth* protuberant; labrum emarginate, supporting two filiform, triarticulate processes, of which the first joint is very short, second linear, third shorter, subulate; *labium* (pedipalpi) bifid, closing the mouth, laciniæ linear, inner edges hirsute, tips rounded; *thorax* oval convex above and beneath, seven-jointed, sutures imbricate; *feet* fourteen, simple, two anterior pairs compressed, terminal joints conic compressed, remaining pairs somewhat cylindric, armed with a minute subterminal nail, sixth pair much the longest; *vesicular branchiæ* oblong, distinct, placed at the inner base of the feet, excepting the first and seventh pairs; *abdomen* abruptly much narrower than the thorax, of three subcylindrical segments, each furnished with natatory feet; *tail* depressed, three-jointed, joints furnished each with a lateral style, which consists of a foliaceous linear peduncle, supporting two acute lanceolate, subequal lamellæ, two anterior styles equal, posterior pair rather shorter, terminal segment attenuated between the posterior styles."

The type species, *Lanceola pelagica*, ♀, is thus described:—"*Antennæ*, inferiores more than half as long as the thorax, superiores attaining the middle of the third joint of the inferiores; *antennæform processes* surpassing the second joint of the inferior antennæ; *thorax*, first segment shortest, acutely angled before near the clypeus, second and third segments longest, equal; *feet*, anterior pair shortest, third, fourth, and seventh equal, fifth longer, sixth longer than the thorax. Length one inch and one fourth. *Inhabits*—Gulf Stream. Say further says that "it is allied to the Amphipoda by the vesicular branchiæ and by the caudal appendices to the genus *Phronima*, more than to any other of this order; in the external appearance of the mouth there is a great similarity to the Linnean *Oniscii*, the labium being nearly the same in form." Spence Bate, "in consequence of the obscurity of Say's description," makes the genus a synonym of the later *Vibilia*, Milne-Edwards. The species he therefore calls *Vibilia pelagica*, not as Milne-Edwards had done *Hyperia pelagica*. Bovallius, 1885, reinstates *Lanceola* as a distinct genus, assigning to it six new species.

1818. Say, Thomas.

An Account of the Crustacea of the United States. Read July 7, 1818, Journal, &c., pp. 374–401.

Say here describes the new species *Gammarus fasciatus* from the rivers, *Gammarus minus*, found in brooks under stones, *Gammarus mucronatus*, *Gammarus appendiculatus*, which has "*caudal segments*, and *three terminal segments of the body*, dentated on their posterior edges." "The remarkable elongation of the inner lamella of the second pair of feet in one sex [♀] is a very striking peculiarity of this species." "It is probable," he adds, "that this animal will form a new or subgenus, which would very probably arrange under Gammarus." Spence Bate leaves the name unaltered, but says, "Certainly it does not belong to *Gammarus*. It appears to be related to *Podocerus*." It is more suggestive of *Mæra*.

The new genus *Lepidactylis* is thus described:—"*Essential character.*—*Antennæ* four-jointed, furnished beneath with plumose ciliæ, intermediate ones with an accessory seta placed at tip of the third joint. *Clypeus* produced between the bases of the intermediate antennæ, and acute. *Feet*, two anterior pairs simple, equal, third and fourth subequal, didactyle, fingers lamelliform; remaining feet spinous, without nails. *Natural character.*—*Body* compressed-oval. *Head* distinct, subquadrate, extended into a short acute rostrum between the intermediate antennæ; *antennæ* subequal, four-jointed, *inferiores* rather longer, incurved, second and third joints dilated beneath, compressed, and ciliated beneath with plumose, elongated hairs, these two joints, when at rest, form a continued oval, the former is dolabriform, terminal seta eight-jointed, verticillate, *superiores* porrected, basal joint dilated, depressed, second one much smaller, placed on the inner tip of the preceding, and with that joint furnished with plumose ciliæ beneath, third joint much smaller than the second, and furnished at the tip with a tri-articulate accessory seta, parallel with the terminal joint; terminal joint of about eight segments, and not longer than the preceding joints conjunctly; *eyes* convex, touching the anterior edge of the head; *thorax* with seven segments, and lateral scales; *feet* fourteen, two anterior pairs in each sex simple, filiform, equal, third and fourth pairs equal, didactyle, hands compressed, not dilated, finger rounded, thumb oval, lamelliform, remaining feet gradually larger, compressed, armed with short spines, and destitute of a nail; hind pair largest, antepenultimate joint lengthened above, and nearly attaining the tip of the following joint, which is crenate and spinous on the edge, terminal joint compressed, serrated, and spinous on the edges, and truncate at tip; anterior pairs of feet furnished at their inner bases, with oblong oval moveable lamellæ. *Abdomen* of three segments, abruptly narrower than the thorax, each furnished beneath with natatory feet, consisting of short, rounded peduncles, supporting double setæ, of which the outer ones are longest, third segment abruptly inflected at tip; *tail* inflected, armed with bifid styles." The species *Lepidactylis dytiscus* has "*Eyes* orbicular; *body* when recent, white, with an abbreviated internal ferruginous vitta, including the alimentary canal; accessory seta of the intermediate antennæ, attaining the tip of the fourth segment of the terminal joint; anterior pairs of feet hairy. Length, male one-quarter, female three-twentieths of an inch." In shallow pools left by the receding tide "its presence may be ascertained by the numerous and irregular tunnels which it forms in the sand, like miniature representations of those of the mole, only less rectilinear." It is the same as *Oniscus arenarius*, Slabber. See notes on Slabber and P. L. S. Müller.

To the genus *Ampithoe*, Leach, Say assigns the new species *Ampithoe serrata* and *Ampithoe punctata* from Egg-harbour, and *Ampithoe dentata*, "a very common inhabitant of the fresh water marshes of South Carolina." *Ampithoe serrata* is thus described:—"*antennæ* equal, short, stout; *eyes* large, approximated, suboval; eighth, ninth, and tenth segments

of the body serrated." "*Clypeus* acute; *antennæ* nearly equal, short, stout, attaining the base of the sixth segment of the body; eyes large, black, oval, placed at the outer base of the superior antennæ, and approximated above; *hands* with about three equidistant, prominent, spinose teeth on the inferior edge or palm, the nail or thumb curved, acute, and attaining the third tooth; eighth, ninth, and tenth segments of the body serrated, the last more conspicuously so. Length, two-fifths of an inch. Remarkable by its large eyes, short, stout antennæ, and serrated appearance of the hind part of the back, occasioned by the elevation of the tip of each of those segments above the base of the succeeding one." Spence Bate renames it *Acanthonotus Sayi*. Say's *Talitrus longicornis* is transferred by Milne-Edwards to *Orchestia*, as his *Talitrus gryllus*, Latr. from Bose, is by Spence Bate. He thus describes his new species, *Podocerus cylindricus*, which S. I. Smith, 1874, withdraws from the synonymy assigned to it in the Brit. Mus. Catal., p. 256, renaming it *Corophium cylindricum*:—"*Hands* of the second pair somewhat cylindrical; *eyes* small, not prominent. *Inhabits* Egg Harbour." "*Eyes* small; *front* acute; *superior antennæ* attaining the tip of the third joint of the inferiores, *inferior antennæ* much thickened, hairy, the terminal joint shorter than the preceding one; *hand* of the second pair not larger than the carpus, *palm* longitudinal, rectilinear, *thumb* much shorter than the hand; third, fourth, and fifth pairs of feet short, much compressed, nail as long as the preceding joint, which is suboval and narrower than the one before it; sixth and seventh pairs reflected, and of the usual cylindrical, elongated form. Length less than three-twentieths of an inch."

The new genus *Unciola* is described as follows:—"*Essential Character.*—*Antennæ* subpediform, superiores with an articulated seta at the base of the fourth joint; *anterior feet* monodactyle; second pair with adactyle compressed hands; *coxæ* not dilated. *Natural Character.*—Head deeply emarginate beneath the eyes to receive a segment of the base of the lower antennæ (ear?), and projecting into an acute angle between the bases of the upper antennæ; *eyes* hardly prominent, placed on a somewhat advanced portion of the head, between the bases of the upper and lower antennæ; *antennæ* robust, terminal joint of the superiores rather longer than the preceding one, furnished at base with an articulated seta, inferiores rather shorter, thicker, terminal joint shorter than the preceding one; Thorax composed of seven segments, each furnished with feet, of which the first pair are largest, *hand* dilated, monodactyle, second pair with a dilated, compressed, subequal carpus and hand, the latter simple, with two minute hooks at tip, posterior pair longest; *coxæ* simple or not remarkably dilated; Abdomen of three segments; *natatory feet* with the filaments subequal; *tail* of three segments, the first and second bearing each a pair of bifid styles, terminal one suborbicular; with a pair of simple, depressed styles, concealed by the others." The type species *Unciola irrorata* is thus described:—"*Eyes* hemispherical; *hands* of the anterior feet with a longitudinal palm, and prominent tooth, those of the second pair compressed, ciliated. *Inhabits* Egg Harbour." "Accessory seta of the superior antennæ, attaining the fifth articulation of the terminal joint; *eyes* conspicuous, rounded; *palm* of the anterior feet a little convex in the middle, a large obtuse tooth at base; nail attaining the carpus, which terminates so as to appear like a second tooth of the hand; second pair of feet ciliated, with a subtriangular hand, segments of the abdomen mucronate each side behind; *colour* when recent, pale with very numerous red points. Length, three-tenths of an inch." Say remarks that it approaches *Gammarus* by the accessory seta to the superior antennæ, *Pherusa* by the form of the second pair of feet, but by various points and general habit "it seems to arrange naturally with Podocerus, Jassa, Cerapus, Atylus, etc."

The species next described, *Caprella geometrica*, is identified by Mayer with *Caprella acutifrons*, Latreille; *Caprella equilibra* is still accepted, with the improved spelling, as *Caprella æquilibra*.

In describing the genus *Cyamus*, Latreille, Say mentions "eyes two; stemmata two," apparently borrowing an error from previous writers, instead of observing his own specimens. On

these, which were "less than one-tenth of an inch," he founds the species *Cyamus abbreviatus*, from a Balæna, species unknown. This *Cyamus* Lütken considers scarcely recognisable. Spence Bate says of the specimens in the British Museum "they appear to me to be only the young of *Cyamus ovalis*."

Milne-Edwards, 1840, takes it for granted that Say's *Gammarus minus* is merely a slip of the pen for *Gammarus minimus*, and inclines to identify the species with *Gammarus fasciatus*, which in its turn he considers very near to the French "crevette des ruisseaux." *Gammarus mucronatus* is transferred by Sp. Bate to *Gammaracanthus*, but S. I Smith, 1874, objects to this, "for the dorsal margin is not distinctly carinated, and the third, fourth, and fifth segments of the abdomen are furnished with fascicles of spines;" he therefore restores the species to *Gammarus*.

1818. CHIEREGHINI, STEFANO, born 1745, died 1820 (Nardo).

Descrizione de' crostacei, de' testacei e de' pesci che abitano le lagune ed il golfo Veneto rappresentati in figure a chiaro-scuro ed a colori. Manoscritto in foglio in vol. 12, esistente presso il R. Liceo di Venezia (Santa Catterina, ora Marco Polo).

G. O. Nardo assigns to this work, though still in manuscript, a quasi publication in 1818, about which date it was acquired by the imperial government and consigned to the public library in Venice, where it has been, and still is, consulted by naturalists. The first two volumes, Nardo says, treat of Crustacea, one containing the descriptions, the other the figures. The species there described and figured by Chiereghini are sixty-four, thirty-three of which bear the Linnean names, while thirty-one he considered to be new. After certain necessary deductions from this number, Nardo allows Chiereghini the credit of having described and figured twenty-four species, either new, or till then obscure. Among these are two Amphipods, called respectively "Cancer Salectus" and "Cancer Algensis," for which see note on Nardo, 1847.

1818. LAMARCK.

Histoire naturelle des Animaux sans vertèbres, présentant les caractères généraux, et particuliers de ces animaux, leur distribution, leurs classes, leurs familles, leurs genres, et la citation des principales espèces qui s'y rapportent, etc. Tome cinquiéme. Paris. Juillet, 1818.

The Crustacea are the eighth class. The Isopods, the second section, contain, among the Ionelles, corresponding to the Phytibranches of Latreille, Risso's *Typhis oroides*, which is an Amphipod, along with *Anceus*, *Praniza*, *Apseudes*, and *Ione*. Risso's *Euphens ligioides* becomes *Apseudes ligioides*. The "2.ème Coupe" of the Isopods contains *les Caprellines*, answering to the *cystibranches* of Latreille. In this group *Proto* is dropped from the synonymy of *Leptomera*. The species are *Leptomera rubra* and *Leptomera podata*, both synonyms of *Proto* (*Squilla*) *ventricosa*, O. F. M.; *Caprella scolopendroides*, which Boeck and Kroyer identify with *Caprella* (*lobata*) *linearis*, but which Mayer thinks undecipherable; *Caprella phasma*, now known as *Protella phasma*, Montagu; and *Cyamus ceti*, which Lamarck says has fewer relations with "Pycnogonon" than was generally supposed. He notes a second very small, still undescribed species, from the East Indies, as known to

Latreille. His third section, the Amphipods, contains four genera, 1. *Phronima*, with the species *sedentaria* and *custos*; 2. *Gammarus*, with the species *pulex*, *spinosus*, *articulosus*, *palmatus*, *grossimanus*, *phœnisa*, and the remark, "etc. Le *gammarus rubricatus*, Montag. Trans. Soc. Linn. 9, p. 99, tab. 5. f. 1. est encore de ce genre. *Amphithoë*, Leach"; 3. *Talitrus*, with the species *locusta*, *gammarellus*, *carinatus*, and an "etc."; 4. *Corophium*, with the species *longicorne*, and the final "etc. Rapportez aux corophies les genres *podocere* et *jassa* de M. Leach."

1818. LATREILLE, P. A.

Tableau Encyclopédique et méthodique des trois règnes de la nature. Vingt-quatrième partie. Crustacés, Arachnides et Insectes, Par M. Latreille. A. Paris, M.DCCCXVIII.

The Amphipoda, of which figures from various sources are given in this volume, are thus named in the "Explication des Planches":—Planche 327. 3. *Atylus carinatus*, Leach. "Planche 328. 1 et 2. *Gammarus ampulla*, Fabricius. 3. Appendices de sa queue. 4 et 5. *Gammarus nugax*, Fabricius. 6. *Gammarus cancellus*, Fabricius. 7 et 8. *Gammarus* (corophium, Latreille;) *longicornis*, Fabricius. 9. *Talitrus Locusta*, Latreille. 10. *Talitrus gammarellus*, Latreille. 11 et 12. *Gammarus pulex*, Fabricius. 13.—grossi. 14. Ses œufs, de grandeur naturelle. 15.—grossis. 16. *Item*, lorsqu'ils sont plus avancés et que le fœtus commence à s'y montrer. 17 et 18. *Phronima* . . . . , Latreille. 19. Appendices de sa queue, très-grossis. 20. *Gammarus* (caprella, Lamarck;) *linearis*, Fabricius." In this list 1. 2. 3. belong to *Stegocephalus ampulla*, 4. 5. to *Anonyx nugax*, 6 to *Pallasea cancellus*, 7. 8. to *Corophium volutator*, 9 to *Talitrus locusta*, 10 to *Orchestia gammarellus*, 11. 12. 13 to Rösel's *Gammarus fluviatilis*, 17. 18. 19 to what Latreille afterwards named Hypérie de Lesueur, 20 to *Caprella*, sp?

Planche 329 has "14 et 15. *Cyamus ceti*, Latreille. 16. La femelle, en dessous." Planche 330 has "3. *Oniscus arenarius*, Slabber; nouveau genre, voisin de celui que j'ai nommé *ione*. (Cuvier, *Règne animal*, tom. iii. p. 54). 4.—très-grossi." This is Slabber's figure, of which Latreille subsequently complains that it only exhibits eight legs. Nevertheless, the figure is sufficiently characteristic.

Planche 336 contains "18. *Phronima sedentaria*, Latreille; grossi. 19. Appendices de l'extrémité de sa queue, très-grossis. 20. Sa tête, très-grossie. 21. Ce crustacé dans son habitation formée du cadavre d'un zoophyte (béroé?). 22. Cette habitation sans l'animal." "29. *Gammarus obtusatus*, Montagu; grossi, représenté (observation de M. Léach) sur un individu altéré: 30. *Leucothoe articulata*, Léach; grossi. 31. *Melita palmata*, Léach. 32. *Gammarus pelagicus*, Montagu; grossi; *jassa pelagica?* Léach. 33. *Ampithoe rubricata*, Léach; grossi. 34. *Talitrus locusta*, Latreille; grossi. 35. *Orchestia littorea*, Léach; grossi. 36. *Typhis ovoides*, Risso. 37. *Cancer* (caprella Lamarck;) *phasma*, Montagus; grossi. 38. *Proto*. . . . . Léach." "43. *Gammarus mutilus*, Müller. 44. *Gammarus podurus*, Müller. 45. *Mæra grossimana*, Léach; grossi.

1818. O'REILLY, BERNARD.

Greenland, the adjacent seas and the north-west passage to the Pacific Ocean illustrated in a voyage to Davis's Strait, during the summer of 1817. London, 1818.

In the "Journal in Davis's Strait" it mentions for June 2, "a male whale killed this morning measured seventy feet;" "groups of the oniscus ceti, whale-louse, attached to the epi-

dermis of this whale, particularly about the fins and anus," p. 166. For July 18 it says, "The monodon appeared in great number this day, and the Thomas's men succeeded in killing one male and two females: the latter were destitute of the tooth: they are always taken without that instrument, which is solely conferred on the male either for ornament or annoyance: . . . . a female whale (balæna mysticetus) killed this day, measured sixty feet: it received the harpoon but once, and dived away under the ice, drawing down three boats' lines, being 1080 fathoms, and died at the bottom: immense groups of the oniscus ceti attached to the under lip and to the under part of the fins: the edge of the fleshy covering embracing the root of the monodon's tooth was covered with insects of the same description."

1818. LEACH, W. E.

Crustacés, *Crustacea*. Dictionnaire des Sciences Naturelles, dans lequel on traite méthodiquement des différens êtres de la nature, &c. Tome douzième. Strasbourg, Paris, 1818. pp. 69–75.

The Crustacea are said to form two great groups or subclasses, of which the first comprises the Malacostraca, which has a pair of mandibles, and two pairs of maxillæ, furnished with palps, and eight pairs of feet provided with branchiæ at their bases. All the genera devoid of these characters belong to the second group, the Entomostraca. Leach then briefly reviews the various classifications of Crustacea, including those by himself, that had been proposed up to the date of this article. He gives a list of authors who have written on Crustacea, and deferring the details about genera and species to the articles on the several families, he winds up with an alphabetical list of the Crustacean genera recognized at that date, including for the Amphipoda, *Aerope*, *Ampithoë*, *Atyle*, *Caprelle*, *Cerapode*, *Corophie*, *Crevette*, *Dexamine*, *Jassa*, *Larunde*, *Leucothoë*, *Melitée*, *Orchestie*, *Pheruse*, *Phronyme*, *Podocère*, *Proto*, *Talitre*, *Typhis*, mixed up in alphabetical order with the rest. That *Aerope* belongs to the Amphipoda, my only authority is Desmarest.

1818. LEACH, W. E.

Memoirs of the Wernerian Natural History Society. Vol. II. For the years 1811–1816. Edinburgh, 1818.

Leach refers to this volume for his species, *Jassa pulchella* and *Jassa pelagica*, but since the references occur in the Appendix to his Article, Crustaceology, in the Edinburgh Encyclopædia, which cannot well be of later date than 1814, and these memoirs seemingly were not published till 1818, he probably refers to some paper intended for this volume, but withdrawn before publication.

1819. LEACH, W. E.

Zoological Memoranda. Descriptions of the New Species of Animals, discovered by His Majesty's Ship Isabella, in a Voyage to the Arctic Regions. By Dr. W. E. Leach. A Voyage of Discovery, made under the Orders of the Admiralty, in His Majesty's Ships Isabella and Alexander, for the purpose of exploring Baffin's

Bay, and enquiring into the probability of a North-West Passage. By John Ross, K. S., Captain Royal Navy. Second Edition. Vol. II. London, 1819. Appendix No. IV.

Under "Type Annulosa," "Class Crustacea," is given "Genus, GAMMARUS, *Latreille*. Species 1. *Sabini*, segmentis dorsalibus postice falcato-productis. Baffin's Bay, Captain Sabine." This is the Amphipod, so often described both before and after this date, called *Amathilla sabini* by Bate and Westwood, and in this Report identified with *Gammarus homari*, Fabricius.

1819. SAMOUELLE, GEORGE.

The Entomologist's Useful Compendium; or an introduction to the knowledge of British Insects, comprising the best means of obtaining and preserving them, and a description of the apparatus generally used; together with the genera of Linné, and The Modern Method of arranging the Classes Crustacea, Myriapoda, Spiders, Mites and Insects, from their Affinities and Structure, according to the views of Dr. Leach. Also an explanation of the terms used in entomology; a calendar of the times of appearance and usual situations of near 3000 species of British insects; with instructions for collecting and fitting up objects for the Microscope. London, 1819.

The preface explains that "The Modern System is nearly the same as that given in the Supplement to the Encyclopædia Britannica, article Crustaceology, and Dr. Brewster's Edinburgh Encyclopædia, article Entomology, with the exception of the foreign Genera and the alteration of Tribes to Families, terminating in *idæ*." Notwithstanding this notice, the three Families belonging to the Amphipoda are given, pp. 101–106, as "Fam. I. PHRONYMADÆ. Leach's MSS." "Fam. II. GAMMARIDÆ. Leach's MSS." "Fam. III. CAPRELLADÆ. Leach." All the information is derived from the papers by Leach. The articles referred to in the Preface are probably the Crustaceology of the Edinburgh Encyclopædia and the Annulosa of the Supplement to the Encyclopædia Britannica.

1819. SAMOUELLE, GEORGE.

A nomenclature of British Entomology, or a Catalogue of above 4000 species of the classes Crustacea, Myriapoda, Spiders, Mites and Insects, alphabetically arranged, and intended as labels for cabinets of British insects, etc. From the Entomologist's Useful Compendium. London, 1819.

This work is merely the index of the preceding, adapted for the purpose mentioned in the title.

1819. TILESIUS, W. G.

Ueber das nächtliche Leuchten des Meerwassers. Neue Annalen der Wetterauischen Gesellschaft für die gesammte Naturkunde. Erster Band. Frankfurt am Main, 1819. pp. 1–10. Pl. XXI.

Tilesius says that the sea-water is illuminated not only by the Mollusca contained in it, but also by the marine insects or microscopically luminous shrimps (Krebschen). Of these he

figures and describes several, with a warning that the figures indicating the natural size are in reality somewhat exaggerated. The following portion of his account is worth quoting here :—

"Fig. 4. *Amblyrrhyncotus glaucus.* Der blaue Stumpfrüssel, einer von der grössern Art, bisweilen von der Grösse eines Hirsenkornes. Der ganze Raum zwischen dem Bauche und Schwanze war mit blauen Eiern angefüllt, welche in einer Haut verschlossen zu liegen schienen.

"Fig. 5. *Erythrocephalus melanophthalmus.* Der Rothkopf mit den grossen schwarzen Augen, gehört zu denjenigen *Astacoiden*, welche keinen soliden *Thorax* oder kein besonderes Bruststück, sondern viele fast gleichgrosse Glieder längst dem ganzen Körper haben, wie die *Arthrocephali* oder Gliederköpfe Dumenils [Duméril], und wie der *Cancer sedentarius* Forskaelii. Der unsrige aber steht mit jenem der Grösse nach in keinem Verhältnisse. Pallas hatte diese vielgliedrigen kleinen Krebse als die *Squillæ* und *Gammari* des Fabricius, *Thalitras* und *Mysis* des Latreille schon alle unter das Geschlecht der *Scolopendern* gebracht.

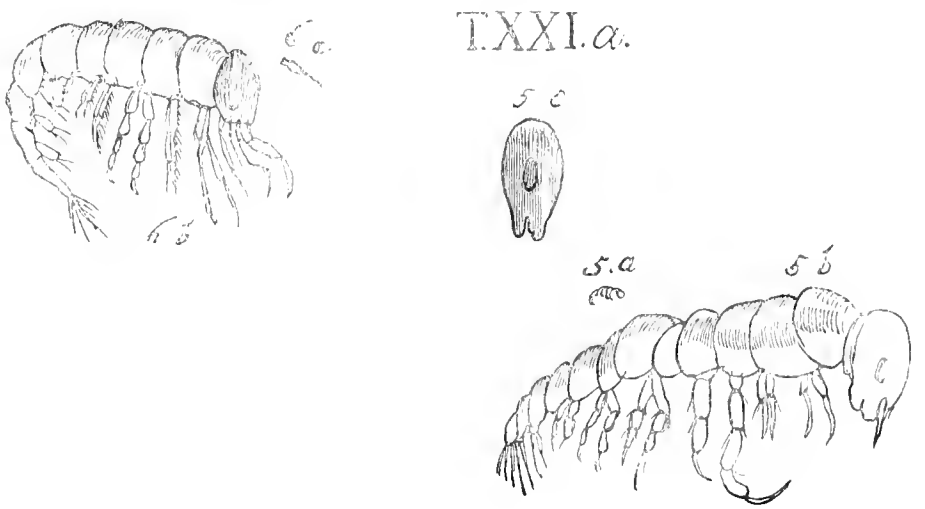


Fig. 19.

"Fig. 6. Der blinde Rothkopf, *Erythrocephalus cæcus*, er hat zwei grosse dreigliedrige Klauen am Kopfe und statt der Augen zwei kleine kaum merkliche Sternchen.

"Fig. 7. Der fusslose Sägerüssel, *Prionorhyncotus Apus.*"

"Fig. 8. Der Sprützenkrebs mit dem Stachelkopfe, *Acanthocephalus syringodes.*"

"Fig. 9. Der blaue Fadenkrebs, *Phasmatocarcinus glaucus*, ebenfalls ein sehr dünner und langer, aber vielgegliederter und vielfüssiger Krebs, welcher den Linnee'schen Fadenkrebsen (*Cancer linearis* L.), oder Gespensterkrebsen (*Gammarus pedatus* O. Müller, *Squilla quadriloba* und *ventricosa* (*Zool. Dan. Tab. LVI.* u. *CXIV.*) und den *Caprellen* oder *Chevrollen* des *Lamark* am nächsten steht, so wie auch der folgende Fig. 10, nämlich der langhalsige gehörnte Gespensterkrebs oder das Scheibenauge, Fig. 10.

"Fig. 10. *Phasmatocarcinus discophtalmus.* Sie haben zwar alle Stielenaugen (*podophthalmi*); aber dieser trägt anstatt des Augen-bulbus, eine breite platte Scheibe auf dem langen Augenstiele, (aus der Südsee, bei den Marquezasinseln)."

Fig. 4 represents rather a *Nebalia*-like form than an Amphipod.

Fig. 5 belongs no doubt to the Hyperina. Templeton thought that it might be the same as his

Thaumalea depilis, which Spence Bate considers to be a *Vibilia*. But while *Thaumalea* appears to have the characteristic antennæ of a *Vibilia*, this *Erythrocephalus* is certainly without them, so that Templeton's guess must be wide of the mark. In the figure here copied from Tilesius we may probably recognise the first two pairs of peræopods, one limb of the third pair, and one of the fourth. If this be correct, it may be inferred that the gnathopods and fifth peræopods were either wanting in the specimen examined or, from their position and insignificant size, escaped the attention of the draughtsman. In addition to the appendages above mentioned, I interpret the figure as showing a vertical head produced below the peræon, a peræon of six segments, without side-plates, and a pleon of six segments and a telson, with pleopods attached to the first three segments and uropods confusedly in attachment with the fifth and sixth segments and the telson. It will be observed that the third peræopods, as in *Promoë capito*, Guérin, and many other Hyperina, greatly exceed in size the other pairs. In saying that Pallas referred such animals to the genus *Scolopendra*, Tilesius has fallen into error, and should have said *Oniscus*.

Fig. 6 evidently belongs to the Hyperina and probably to the Hyperidæ. The front peræopods not unfrequently lie across the sides of the head and protruding beyond it. They have apparently here been mistaken for antennæ. The species intended remains for the present uncertain. It can scarcely belong to the same genus as the preceding species, and the want of well-developed eyes, to which the specific name refers, must itself be regarded as very doubtful.

Figs. 7 and 8 appear remote from the Amphipoda. Figs. 9 and 10, with the large stalked eyes, to which Tilesius himself refers, can have no connection with the Caprellina, though they show a general resemblance. *Amblyrrhynchotus* and *Phasmatocarcinus*, occasionally referred to as if among the Amphipoda, have evidently no right to be so placed.

1820. Rafinesque-Schmaltz, C. S.

Annals of Nature or Annual Synopsis of New Genera and Species of Animals, Plants, &c., discovered in North America by C. S. Rafinesque, Professor of Botany and Natural History in Transylvania University, at Lexington in Kentucky, and member of several Learned Societies in the United States and in Europe, &c. *Exertion unfolds and increases knowledge.* First Annual Number, for 1820. Dedicated to Dr. W. E. Leach, of the British Museum, London. Printed by Thomas Smith, Lexington, Ky. (16 pp. 8o. In the Library of the New York Academy of Sciences.)

For the title page and other extracts from this rare little book I am indebted to my friend and former pupil, William Bradford, Esq., Counsellor at Law, New York. In the course of his plaintive preface Rafinesque remarks, "I shall not be prevented from publishing my new species because it may happen that one ont of fifty may be previously noticed in some costly and inaccessible work."

On p. 2 he gives "Animals. I Class. Mastosia—the Sucklers;" on p. 4 "II Class. Ornithia—the Birds," "III Class. Erpetia—the Reptiles;" on p. 6 "IV Class. Ichthyosia—the Fishes;" V Class. Plaxomia—the Crustacea." In this Class he enters:—

"iii. N. G. Sperchius: Antenna double than the head, four nearly equal, with two long truncate articles, the upper pair rather broader and longer. Body compressed, with seven segments, each with a large lateral appendage or scale. The fourth larger and with an additional posterior appendage, the corresponding feet larger and with a large rounded and

thick hand, all the feet with only one claw. Rump with four large segments, without lateral appendages, but with the usual ones beneath. Tail with short and recurved appendages.—It belongs to the family *gammaria*, the name was that of an ancient fluviatile God of Thessaly.

"39. *Sperchius Lucidus*. Shining brown, eyes black, nearly round; appendages of the tail shorter than the last article, curved outwards, with two articles and a terminal filament. Discovered in the springs and brooks near Lexington, Ky. Length about one-third of an inch, almost black when in the water, olivaceous brown when out of it, and pale when dry. Body arched, antenna descending. It swims well.

"iv. N. G. Lepleurus. Four antenna shorter than the head, nearly equal, truncate, with a single segment. Body rather compressed and straight, with twelve segments, all with a large lateral scale except the three anterior and the last, posterior segments and scales longer. First pair of feet with a large oblong cheliform and cuspidate band; the second and third pair cylindrical pinciferous or with two cylindrical and truncate fingers, the four other pairs slender; all the feet without real claws. Appendages beneath the rump almost similar to the hind feet; those of the tail short and with single segments.—Another fresh-water genus of shrimps, of the family *Gammaria*. The name means lateral scales.

"40. *Lepleurus Rivularis*. Olivaceous, eyes very faint irregular; appendage of the tail truncate straight obliqual; antenna nearly horizontal, feet longer than the breadth of the body.—I have detected it in the brooks of the mountains of Pennsylvania and at Shannon run, near Bedford Springs. Length about half an inch; it crawls on the stones rather than swims or jumps."

He then describes the new genus *Lirceus* in the family *Oniscia*. His remaining Classes are, Entomia, the Insects; Helminthia, the Worms; Apalosia, the Mollusca; Polypia, the Polyps; Porostomia, the Porostomes.

Desmarest objects to the name *Sperchius* as too near to the *Sperchæus* of Fabricius, among the Coleoptera. Neither *Sperchius* nor *Lepleurus* has yet been identified. In the descriptions of both there are perplexing obscurities. The short antennæ of *Lepleurus* are suggestive of *Hyalella*, but the identification must be left to naturalists in Kentucky.

1820. Schlotheim, Ernst Friedrich, Baron von, born 1765, died 1832.

Die Petrefactenkunde auf ihrem jetzigen Standpunkte durch die Beschreibung seiner Sammlung versteinerter und fossiler Überreste des Thier- und Pflanzenreichs der Vorwelt erläutert. Gotha, 1820.

At page 41 he gives "5. Trilobites problematicus. Aus Höhlenkalkstein von Glücksbrunn, der Gebirgsart aufstiegend.

"Höchst wahrscheinlich gehört dieses kleine sonderbare Geschöpf ebenfalls zu den Trilobiten. Leider ist es etwas verdrückt, übrigens aber fast ganz vollständig erhalten. Es ist krumm zusammengebogen, aber die Schilder sämmtlich sehr flach, blos der Rücken wenig gewölbt. Die Kopfbuckeln sind klein und stehen ziemlich eng, nach dem vordern Rande des Brustschildes zu, zusammen, in der Mitte wieder etwas vertieft, das Kopfschild verhältnissmäsig sehr schmal, und die Rückenschilder am Seitenrand mit kleinen Strichen gesäumt. Nur erst bey der Auf-findung recht vollständig erhaltener Exemplare wird sich ausweisen, ob er wirklich zu dieser Familie gerechnet werden muss, womit er allerdings grosse Ähnlichkeit zeigt." See note on Schlotheim, 1822.

1820. Scoresby, William, born Oct. 5, 1879, died March 21, 1857 (Encycl. Brit., 9th Edition).

An account of the Arctic regions, with a history and description of the northern Whale-fishery. In two volumes. Edinburgh, 1820.

At page 541 he gives in the Class Articulata, "Gammarus *arcticus* (Leach).—The characters of this animal (Pl. XVI. Fig. 14), I have been favoured with from Dr. Leach. They are as follows:—"G. oculis sublunatis; pedum pari tertio, secundo majori." The actions of this species suggest as a familiar name, the *mountebank shrimp*. It frequently turns over when in the water, with singular celerity, and swims with equal ease in every position. The four feet raised in the figure above the back are made use of in that position, whenever its back comes in contact with any solid substance. This species occurs in all parts of the Spitzbergen Sea, and at the greatest distance from land; it inhabits the superficial water, and affords food for whales and birds.

"Gammarus——? —Another small species of this family, was found in large quantities in the stomach and mouth of some mysticete. It is remarkable for the largeness of its eyes."

He also mentions "Cancer *Pulex* (Linné)," "Cancer *Ampulla* (Phipps)," from the stomach of a shark, "Cancer *Nugax* (Phipps)," and "Oniscus *Ceti*. (Lin.), Larunda *Ceti* (Leach), *Whale's louse*.—This little animal, about half an inch in diameter, firmly fixes itself by its hooked claws, on the skin of the mysticetus. It is found principally under the fin, or in other situations where the skin is tender, and where it is not liable to be dislodged. A similar animal, but smaller, is sometimes found on the body of the narwal."

Boeck judges that *Gammarus arcticus* is identical with *Gammarus locusta*. The tolerably useless figure shows some seventeen or eighteen segments besides the head. The large-eyed *Gammarus* is probably one of the Hyperina.

1821. d'Orbigny, Charles, born 1806.

Notice sur le *Corophium longicorne*, Latr. Crustacé observé dans les Bouchotz à moules, des communes d'Esmeudes et Charon près la Rochelle. Journal de Physique et Chimie, d'histoire naturelle et des Arts. 1821. Tom. 93, pp. 194–200.

He gives an accurate description of *Corophium longicorne*, which is *Cancer grossipes*, Linné; he enters into details as to its mouth-organs, omitting to notice the under-lip. In regard to its mode of life he states that about winter-time it leaves the strand and goes out into the deep water, returning in the spring and occupying during the summer its holes in muddy shores. The structure of its body is evidently adapted for this mode of life (Boeck).

In the British sessile-eyed Crustacea, vol. i. p. 495, it is not considered certain whether the small tubular galleries in which this *Corophium* spends the summer "are perforated by these Crustacea or by the numerous Annelids that it preys upon." No one, however, who has examined these creatures in their own home could have the smallest doubt that the galleries are perforated by the Crustacea themselves. A stretch of mud may sometimes be seen speckled all over with asterisks, formed by these creatures turning round in their tubes with their antennæ projecting on the surface and marking the mud much as a cook marks pastry with the prongs of a fork. That they prey on Annelids is a very doubtful opinion. An Annelid and a *Corophium*, which I kept for some time alive together in a bottle, made no attempts to injure one another.

1821. Sabine, Sir Edward, born October 14, 1788, died May 26, 1883 (Encycl. Brit., 9th Edition), died June 26, 1883 (Friedländer, Naturæ novitates).

An account of the animals seen by the late northern expedition whilst within the Arctic Circle Being No. X., of the Appendix to Capt. Parry's Voyage of Discovery. By Capt. Edward Sabine, R.A., F.R.S., & F.L.S. London, 1821. pp. 51–57.

After mentioning the *Cancer nugax* and *Cancer ampulla* of Phipps respectively as *Gammarus nugax* and *Gammarus ampulla*, Sabine proceeds to describe *Gammarus boreus*, with a reference to "Squilla Pulex. Degeer Ins. v. 7, p. 525., t. 33., f. 1. and 2." "Individuals, vary in size from half an inch to an inch and half." The fourth, fifth, and sixth segments of the tail, he says, are "slightly tricarinate on the back, and spinous." In general his account of it agrees well with *Gammarus locusta*, with which it is united by Boeck. The remarks with which Sabine winds up his account are of some interest. "The Squilla Pulex," he says, "figured by Degeer, *l. c.*, differing in no respect from the above description, is considered to have been an individual of the same species, and it is therefore believed to be common to the northern shores of Europe and America; the Squilla Pulex has been considered a synonym of the Gammarus Pulex of modern authors, but erroneously, as may be seen by comparing the figure in Degeer with that of the Gammarellus Pulex, Herbst., vol. ii., 130, tab. 36, fig. 4 and 5, which is the Gammarus Pulex of J. C. Fabricius, *Ent. Syst.*, and of Latreille, *Encycl. Méth.* pl. 328, figs. 11–15; the species are very distinct, differing in the lateral lobes, in the mucronate production of the caudal segments, in the absence of the carinæ and spines on the three posterior segments of the latter, and in the shape of the eyes; the Gammarus Pulex of Montagu, *Linn. Tr.* ix, t. 4, f. 2, is a third species, differing not merely in appearance, but in its habits, being found only in fresh water. The Oniscus Pulex of Otho Fabricius, *Faun. Græn.*, No. 231, differs from the present species in the relative proportions of the three posterior pairs of legs, the last pair being described by Fabricius as less than the two preceding, whereas in the Boreus the seventh are longer than the fifth and sixth pairs. The Oniscus Cancellus of Pallas, *Spicil. Zool.* ix, p. 53, tab. 3, f. 18, is distinguished by the lateral scales on the segments of the body, but in other respects is not very dissimilar to the animal under description; it may not be amiss to notice incidentally that an error has crept into the specific character of the Cancellus in the writings of modern authors, commencing it is believed with J. C. Fabricius, of describing it with sixteen legs, instead of fourteen, which is the usual number in the genus; in the original account of the Cancellus, *Spicil. Zool. l. c.*, the number of legs is fourteen, both in the description and figure." The figures cited from Herbst and Latreille are in fact copies of Rösel's *Squilla fluviatilis*, with which Sabine seems to have been unacquainted. The description of Amphipoda with sixteen legs, occasionally met with in the old writers, may have arisen from their including the maxillipeds among the legs. Savigny, it will be remembered, regarded sixteen as the normal number of legs both for the Decapoda and the Tetradecapoda, the difference between those two groups being that in the former three pairs, and in the latter only one pair, of the legs were transferred to the service of the mouth.

The species next described has since been made by Spence Bate the type of the genus *Gammaracanthus*. Sabine's account is as follows:—"Gammarus Loricatus. G. Rostro corniformi deflexo, dorso carinato, segmentis posticè et acutè productis. Plate I, fig. 7. This species was found associated with the preceding, and of the same size, but less abundant; body laterally compressed, especially the posterior segments; shell smooth,

and much harder than in its congeners, resembling a coat of mail, whence the specific name; back carinate, the segments increasing in length from the first to the tenth, from whence they decrease; and beginning with the third or fourth, are produced in sharp and strong points directed backward: lateral lobes oblong, enlarging from the first to the fourth segment, and decreasing to the seventh; those of the three first caudal segments are larger than those of the body, and are acuminate; head produced into a strong, arched, carinate, and sharp-pointed rostrum, curving down between the antennæ; eyes large, black, lateral, prominent and reniform; beneath the eyes is a small lateral lobe; antennæ four-articulate, the upper pair having a small seta at the base of the fourth articulation; legs fourteen, two first pair with a large compressed monodactyle hand, those of the anterior pair being smaller than the others; third and fourth pairs of the same length as the preceding, slender, terminating in a nail; the three posterior pair directed backward, similar in formation, but differing in size, the middle and longest pair being as long as the body, and the seventh pair shorter than the fifth, all terminating in a nail; colour in some individuals pale, in others varied red and white." He points out that it differs from *Oniscus serratus* of O. Fabricius, from *Gammarus carinatus* of J. C. Fabricius, and from *Gammarellus pulex* of Herbst. *Atylus carinatus* is mentioned as the name given by Leach to the species *Gammarus carinatus*.

Sabine next gives "Gammarus Sabini. Leach in Ross's Voyage, Ed. 8vo., Vol. 2, page 178. G. segmentis dorsalibus postice falcato productis, capite inter antennas acumine minuto. Plate 1, fig. 8–11. On the shores of Baffin's Bay, but not met with in the Polar Sea: the head of this species which terminates in a point between the antennæ, instead of being produced in a rostrum, readily distinguishes it from the preceding species, and has been added to the specific character assigned by Dr. Leach, in whose arrangement it was unnecessary, the formation of the head making part of the character of the genus."

The next species, "Talitrus Edvardsii, T. Rostro corniformi, antennis subæqualibus, corpore ovato depresso, caudâ compressâ tricarinatâ spinosâ. Plate II, fig. 1–4.," though here described as new, is the *Oniscus aculeatus* of Lepechin, now *Rhachotropis aculeatus*. The remarks which follow the description bear upon classification. "In conformity," the author says, "with the arrangement which is followed in the present account, this species has been considered a Talitrus, as the inferior antennæ are somewhat longer than the superior; this character is, however, by no means remarkable either in this species, or in some others, which are distributed by it into the respective genera of Talitrus and Gammarus; if a subdivision be desirable in the well-defined and natural genus comprehending all these animals which so nearly resemble each other in general appearance and habits, the prolongation of the anterior part of the head into a rostrum, would seem preferable to a distinction founded on the relative length of the antennæ, which in many of the species are so nearly the same; or, the genus Talitrus might be limited to those species in which the superior antennæ are very short, not exceeding the length of the two first articulations of the inferior pair." He adds that "this species has been named in compliment to John Edwards, Esq., surgeon of the Hecla."

The remaining species "Talitrus Cyaneæ. T. capite obtusissimo, antennis subæqualibus, corpore latiore, pedibus quatuor anticis inunguiculatis. Plate 1, fig. 12–18.," was taken "parasitic on the Cyanea Arctica, the individuals varying in length from two to eight-tenths of an inch: colour pale yellowish red, sprinkled with innumerable minute spots of deeper red; in about half the specimens, the number of which was considerable, the antennæ were equal in length to the five first segments of the body; in the others they were scarcely one-fifth as long, but otherwise similar; there was no other perceptible difference in the specimens." The eyes are "extremely large, lunate, of a brownish red colour." In the further course of the description he mentions "legs fourteen, the four anterior equal and

similar, five-jointed, being a long compressed thigh with four much shorter articulations, hirsute, and unarmed; the ten posterior legs similar and equal in size, five-jointed, the thigh being long and much compressed, followed by three short fleshy joints, (the first of which is the shortest,) and by a long and curved member, terminated by a nail." He concludes by observing, "this description differs from that of the Cancer Medusarum, Otho Fabricius, *Faun. Groen.*, No. 332, in the number of joints of the legs, and in the four anterior being unarmed; the conformation of these legs distinguishes it also from the Gammarus Medusarum of J. C. Fabricius, of which a part of the specific character is 'manibus quatuor monodactylis.'" It is with the latter species nevertheless that Boeck identifies it, under the name *Hyperia medusarum*, O. F. Müller. Milne-Edwards, Hist. des Crust. iii. p. 78, under the genus *Metœcus*, after describing *Metœcus medusarum*, Kröyer, says of it, "Le Talitrus cyaneæ de Sabine, que nous avions d'abord considéré comme une Hypérie, semble se rapprocher davantage des Métoèques, mais devra peut-être former un genre particulier, car d'après l'auteur qui l'a fait connâitre, cette Hypérine aurait les pates des deux premières paires obtuses et adactyles; mais la division en pinces a peut-être échappé à son attention. Du reste, cette espèce se distingue de la précédente, et des Hypéries mentionnées ci-dessus, par la longueur beaucoup plus considérables de ses antennes, dont le filet terminal est grêle et multi-articulé." Spence Bate, in the Brit. Mus. Catalogue, p. 294, retains the species as *Hyperia cyaneæ*.

1822. Mandt, Martin Wilhelm, born 1799, died 1858 (G. O. Sars).

Observationes in historiam naturalem et anatomiam comparatam in itinere Groenlandico factæ. Dissertatio inauguralis quam consensu et auctoritate gratiosi medicorum ordinis in universitate literaria berolinensi ut summi in medicina et chirurgia honores rite sibi concedantur die xxii. M. Julii A. mdcccxxii. H.L.Q.S., publice defendet auctor Martinus Gulielmus Mandt Beyenburgensis.

In 1821 Mandt went in the "Blücher," Captain John Rose, past Spitzbergen to the 81° of north latitude. He here makes record of his acquisitions, material and scientific, in those regions. In describing "Balœna Mysticetus," he says, page 10, "Partibus tenerioribus cutis, axillis, pudendis Oniscus ceti adhæret, præsertim si tempus instat coitionis," and "Vulva præcipue hoc tempore iis obsessa apparet." The *Oniscus ceti* here mentioned is the *Cyamus mysticeti* of Lütken.

On pp. 31–37 he describes two Amphipods, of which the first has since been referred to Guérin's *Themisto*, and is the earliest described species of that genus, while the second has become the type of Lilljeborg's genus *Eurytenes*. The original account as drawn up by Lichtenstein is here subjoined.

"E crustaceorum ordine duas ex itinere retuli species, Oniscis marinis Linn: aut Gammaris Fabricii accensendas nec ab ullo auctore hucusque descriptas. Quæ cum museo locupletissimo hujus Universitatis a me oblata essent, a viro celeberrimo hujus Musei directore Lichtenstein accuratius examinatæ, dignæ visæ sunt quarum descriptio amplior huic dissertationi inseratur. Qualem vir doctissimus benevole mecum communicavit lectoribus naturæ curiosis hic offero.

"I. Gammarus Libellula N.

"*G.* capite magno globoso, corpore segmentis undecim, pedibus quatuordecim, octo anticis brevibus, uncinatis, raptatoriis, sex posticis elongatis, saltatoriis.

"*Longitudo* tota æquat pollicem et dimidium.

"*Corpus* compresso-cylindraceum, incurvatum, saltatorium. *Caput* globosum, utrinque inflatum, hemisphærio utroque oculum magnum sessilem mentiente.

"*Antennæ* breves, scrobiculis profundis frontalibus implantatæ, superæ breviores, (sesquilineares) articulo basali et seta apicali subtriquetra, conflatæ, inferæ paullo longiores, bilineares, triarticulatæ.

"*Mandibulæ* exiguæ, inæquales, argute dentatæ. Palpi mandibularum lateri externo inserti, quadriarticulati, in fossulam inter antennas inferiores reclinandi. *Segmenta* corporis primum, secundum, tertium quartumque, angusta (*Notetur terminos angustum et latum hic a dimensione singuli segmenti, minime autem a latitudine corporis esse intelligendos.*), sensim latiora utrinque in appendicem foliaceum articulatum producta, subtus pedes gerentia breves raptatorios, fe-inde [?perinde] e primo pari sensim maiores, femoribus complanatis, manibus incrassatis subtus spinescentibus, pro recipiendo unguiculo valido, elongato. *Segmenta* quintum, sextum et septimum paullo latiora, lateribus vix appendiculatis, margine externo cum *pedibus* articulo iuncta elongatis, saltatoriis, postice complicandis, corpore incurvato pedes octo anticos inter se occultantibus. Horum femora complanata, margine postico foliaceo pro tegenda tibia reclinanda, tibiæ geniculo basali brevi, elongatæ, compressæ, antice spinescentes, postice glaberrimæ; tarsi graciles, subcylindrici, rigidi, margine antico spinescente tibiis applicandi, apice unguiculo minuto acutissimo instructi. Pedum par quintum omnium longissimum fere pollicare, tibiis quatuor et dimidiam lineas longis, sextum, septimum sensim breviora, postremo octo lineas longo.

"*Segmenta* octavum, nonum et decimum, *caudalia* omnium latissima fere cylindrica subtus appendicibus ovigeris natatoriis, in singulo binis bifidis, articulo basali valido, conico, subtus unisulcato, lacinia terminali duplici, acuminata, subtriquetra, ciliata.

"*Segmenta* undecimum duodecimumque, flabellum caudale efformantia, appendicibus utrinque tribus bifidis conflatum, quorum articuli basales elongati, compressi; laciniæ terminales, in singulo binæ inæquales, altera longiore foliacea, altera breviore accessoria teretiuscula. *Color* flavescente lividus.

"Affinis hæc species 1) Onisco Cicadæ Oth. Fabricii *[1] a quo tamen differt capitis pedumque forma, colore et magnitudine;

"2) Onisco Medusarum O. Fabricii, cuius tamen oculi lineares, arcuati, coerulei, lateribus frontis innati, nimis discrepant. Cum hac utraque Gammarus Libellula peculiare genus constituat, in familiæ hujus descriptione monographica arctius definiendum.

"Unicum hujus animalculi specimen die vicesimo nono mensis Iunii anni præterlapsi accepi vivum e mari prope insulam Ian Meyen protractum, plura autem mense insequente mortua in stomacho Procellariæ glacialis reperi, integra quidem et digestione vix læsa, nisi quod pedum subtilissima pubes detrita esset.

"Inter hæc juvenilia quoque, dimidiæ reliquorum magnitudinis, cæterum simillima illis.

"II. Gammarus Gryllus N.

"G. Corpore segmentis tredecim, pedibus quatuordecim, quorum par secundum longissimum, debile multiarticulatum, scutis lateralibus maximis pedes obtegentibus.

"Longitudo tres pollices æquat (corporis duos et quadrantem, caudæ incurvatæ tres quadrantes poll.) circumferentia media duos pollices quadrantemque.

"*Corpus* compressum, dorso fornicato, rectiusculum, cauda brevi incurvata.

"*Caput* cylindricum quasi primum corporis segmentum, antice obtusum, antennis quatuor conicis, brevibus?*[2] superis pedunculo triarticulato bifidis, inferis longioribus quadriarticulatis, articulo secundo seta parva, postremo cæteris longiore.

[1] "**O. Fabricii Fauna groenlandica, pag. 257–258. Præter hunc reliqui auctores omnes (Pallas, Müller, Stroem, Leach) de simili specie tacent. Unicam ob oculos amplos insignem Scoresby (Account of the arctic regions pag. 542) commemorat, cæterum sibi minus notam."

[2] "* *Antennæ in specimine nostro vix integræ, apice obtuso detrito.*"

"*Oculi* satis ampli, ovati, laterales, sub insertione antennarum inferarum, (in mortuo) albicantes.

"*Os* productum compressiusculum, anticum, labro tuberculoso corneo, *mandibulis* validis osseis, margine antico serrato.

"*Maxillarum* par primum elongatum, apice tricuspidatum utrinque palpo triarticulato et basi lamina foliacea, apice ciliata. Par secundum inferum mento amplo geniculato, labio bifido utrinque palpo complanato triarticulato, apice obtuso ciliato.

"*Segmentum* corporis primum latum, margine antico caput postico segmentum secundum excipiens, appendice scutiformi laterali exiguo, cuius paginæ internæ pedes primi paris inserti sunt compressi, molliusculi, palpiformes, quinquearticulati, articulis (basali femore excepto) unispinosis, terminali ciliato.

"*Segmentum* secundum reliquis angustius, scuto laterali ampliore fere quadrato, cuius paginæ internæ infixum par pedum secundum, qui structura prioribus similes omnium longissimi (quatuordecim lineas) quinquearticulati, antice complicandi et abscondendi inter membranam tenuem, a ventrali huius segmenti pagina tendentem, scutum magnitudine adæquantem.

"Segmenta tertium quartumque æque lata, scutis lateralibus maximis, rotundatis, postice emarginatis, e quorum basi interna tendunt pedes, æque longi (decem lineas) antrorsum versi, quinquearticulati, unguiculo terminali instructi. Accedit ad singulum pedem a latere interno membrana tenuis, lanceolata, margine ciliis longis obsita.

"*Segmenta* quintum, sextum et septimum eiusdem latitudinis, pedes gerunt retrorsum versos quasi saltatorios, præcedentibus vix longiores, inter se æquales, scuto amplissimo triarticulato iunatos, ut cuiusvis scuti articulum dignoscas femoralem, tibialem et tarsi. Inde femur, tibia, tarsus vere alati. Non nisi extimus singuli pedis articulus cum unguiculo liber emergit. Par quintum intus membrana lineari.

"*Segmenta* octavum, nonum et decimum latissima postremum antice gibbum, pro incurvanda cauda, subtus gerunt appendices natatorios, singulum binos bifidos satis elongatos. Horum quoque margo lateralis foliaceus, protenus sed cum parte dorsali connatus, haud articulo iunctus uti priorum.

"Segmenta undecimum, duo-decimum, decimum tertium incurvata, vix erigenda, sensim angustiora laminas caudales gerunt corneas, rigidas, biarticulatas, bifidas sex, quibus accedit septima intermedia, minuta, duplex e parte dorsali postremi segmenti oriens. Segmentum undecimum medio impressum quasi bituberculatum.

"Color speciminis nostri fere carneus.

"Unicum quod ex itinere retuli specimen a Procellaria glaciali, hamulo capta vomitu eiectum est, quum ictu lethali in occiput percussa esset. Testa animaleuli vix nisi forte apice antennarum læsa, sed quasi inanis non nisi adipe oleoso, piscini illius odoris tota repleta. Celerrimam igitur mutationem omnia ingesta vel tegumentis solidioribus inclusa in his avibus subire videntur."

It would seem fair to accredit these two very interesting species to Lichtenstein, since Mandt expressly acknowledges his indebtedness to that professor for the descriptions just as they are here given. *Gammarus gryllus* was redescribed by Milne-Edwards in 1848 as a new species under the name *Lysianassa magellanica*.

1822. Risso, A.

Mémoire Sur quelques nouveaux Crustacés observés dans la mer de Nice. Journal de Physique, de Chimie et d'Histoire Naturelle. Tome XCV. Octobre. An 1822. pp. 241–248.

The new genus *Phrosina* is thus defined :—"Deux antennes à peine apparentes ; yeux sessiles ; tête prolongée sur le devant en forme de museau ; mandibules palpigères ; corps oblong,

un peu arqué, sub-arrondi sur les côtés, à segmens crustacés transverses, dix pattes monodactyles, dissemblables, le dernier article falciforme, aigu au sommet." The type species is *Phrosina semilunata*. *Phrosina macrophthalma*, n. sp., is also described, a doubtful species which, in the opinion of Spence Bate, probably belongs to the genus *Anchylomera*.

1822. Schlotheim, E. F.

Nachträge zur Petrefactenkunde. Gotha, 1822.

In this work, at p. 38, Schlotheim places *Trilobites problematicus* among the doubtful species. He gives figures of it, which are here reproduced, on Pl. XXII. fig. 8, *a*, *b*. He remarks further, "Ausser dem Kopfschilde mit dem beyden augenähnlichen Wärzchen scheinen noch zwey Reihen anders gestellter Schilder zwischen dem Kopfschilde und den sehr schmalen Rückenschildern zu liegen, welche letztere an den Seiten mit einem durch feine Striche ausgezeichneten Saum versehen sind. Es hat den Anschein, als wäre der

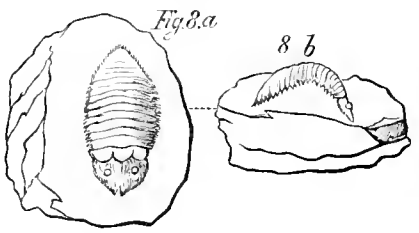


Fig. 20.

Hinterleib, nach Art des Asaphus, mit einem besondern Schwanzschilde bedeckt; doch ist diess in der Versteinerung nicht deutlich genug ausgedrückt. Das Kopfschild scheint vorn mit kleinen Zähnen, vielleicht aber auch mit Fresswerk-zeugen und Fühlspitzen ausgerüstet zu seyn." It seems a somewhat wild conjecture that has placed this specimen, since mislaid or lost, in the ranks of the Amphipoda, and identified it with the *Palæocrangon problematicus* of Schlauroth, and the *Prosoponiscus problematicus* of Kirkby.

1823. Blainville, M. H. D. de.

Essai sur une nouvelle classification des Animaux. Les Principes d'Anatomie comparée. Tom. i. tab. 7. Paris, 1823.

This, according to Desmarest, is the same essay, with some modifications, as that already noticed, published in the Bulletin des Sciences, 1816.

1823. Desmarest, Anselme Gaetan, born 1784, died 1838 (Hagen).

Dictionnaire des Sciences Naturelles. Tome vingt-huitième. Strasbourg. Paris. 1823. Article Malacostracés. pp. 138–425. Tableaux I–V.

The articles on Crustacea for this dictionary were entrusted to Leach, but while the notices from G to M were being published, Leach was prevented by illness from attending to the work. The word *Malacostraca* gave Desmarest an opportunity, without breaking the alphabetical order of the dictionary, of supplying the past omissions in reference to the Crustacea by

one comprehensive article on the group. In 1825 this article, without material alteration, was converted into a separate volume. Its treatment of the Amphipoda may be understood from the note on Desmarest under that date.

1823. FLEMING, JOHN, born 1785, died 1857 (Rev. J. Duns, in Lithology of Edinburgh).

Gleanings of Natural History, gathered on the Coast of Scotland during a voyage in 1821. By the Rev. JOHN FLEMING, D.D., F.R.S.E., M.W.S., &c. In a letter to Professor JAMESON. The Edinburgh Philosophical Journal, &c., from October 1, 1822, to April 1, 1823. Vol. VIII. Edinburgh, 1823. pp. 296–297.

In *Proto pedatus*, Fleming says that he readily distinguished "the four minute appendiculæ of the posterior end, which are figured by Müller, but which Montagu was unable to detect in his specimens." Of Latreille's definition of the genus *Proto*, Leach, he says, "it is true that there are only ten feet, if we exclude the two pairs belonging to the first and last segments of the body; but if these be included, the number of feet should be stated at fourteen. This precision in enumerating the feet becomes the more necessary, since Latreille has added another genus, termed *Leptomera*, to the family CAPRELLADÆ, which, in the character assigned to it, 'Ont quatorze pieds, disposés dans une série continue, depuis la tête jusqu' à l'extremité postérieure du corps,' would appear to differ only in having four additional feet. But the *Squilla centricosa* of Müller (Zool. Dan. tab. 56.), referred to as the type of the genus *Leptomera*, possesses the same number of feet as the *Gammarus pedatus* of the same author, referred to as the type of the genus Proto. The feet of the first and last segments of the body, however, have been enumerated by Latreille, in the character of his genus Leptomera, while they have been excluded from the character of the genus Proto. The two genera, in consequence of this arrangement, seem to differ in a character in which they agree." He criticises Lamarck for retaining "dix ou quatorze pattes" as a character of the genus *Leptomera*, of which he made *Proto* a synonym, instead of giving *Proto* the priority. But Fleming himself would retain both genera on new grounds. "In the Leptomera," he says, "the tarsi of the second pair of feet only are furnished with a moveable claw; while in Proto, all the feet are unguiculated. In the latter genus, the second, third, and fourth pairs of feet have appendages at the base, which are wanting in Leptomera. We are not aware that the *Leptomera centricosa* has ever been detected on the British shores."

Of *Cancer phasma* of Montagu, which he refers to *Caprella*, he says, "it is subject to considerable variation in the number and position of the spines, and the hairiness of the different parts. In the example now before us, the claw and last joint of the first pair of feet were deeply serrated. It is probable that the *Caprella Pennantii* and *acanthifera* of Dr. Leach (Edin. Encyclopædia, vol. vii. p. 404), are merely varieties of this species."

1824. MARTENS, GEORGIO.

Reise nach Venedig. Ulm, 1824.

According to G. D. Nardo, he mentions *Gammarus pulex*, Fab., *Oniscus* (*Caprella*) *linearis*, Latr., with many other Crustacea. Zenker, 1832, speaking of the universal distribution of *Gammarus pulex* in the rivers and streams of Europe, adds, "vix tamen in tepidis aut calidis inveniatur aquis, licet Martens (*Reise nach Venedig*. Wien. 1824. II., 197) ipsum in thermis Albanis vivere contenderit, sine dubio *Gammarum Locustam* cum nostro commutans." Zenker had found that *Gammarus pulex* speedily died in warm water, but he had probably not put *Gammarus locusta* to the test.

1825. Audouin, Jean Victor, born 1797, died 1841 (Hagen).

Explication sommaire des Planches dont les dessins ont été fournis Par M. J. C. Savigny. Pour l'histoire naturelle de l'ouvrage. [See Note on Savigny, 1825.]

In regard to Pl. XI., which alone concerns the Amphipoda, Audouin assigns to figure I the name *Gammarus dulongii*, now known as *Tanais dulongii*. Fig. 2. he recognizes as Savigny's *Lycesta furina*, and adds, "Ce crustacé a beaucoup d'analogie avec la *Leucothoë articulata* de Leach, et appartient certainement au même genre."

He continues for the other figures as follows:—

"La figure 3. *1* représente une espèce fort curieuse, qui doit constituer un petit sous-genre voisin des *Mera* et des *Melita* de M. Leach, et qui se distingue facilement de celui qui précède, par la seconde paire de pieds développée outre mésure et en forme de pince (seulement du côté gauche); nous lui assignerons le nom de M. Fresnel *Gammarus Fresnelii*. Ce crustacé singulier est très-petit, ainsi qu'on peut le voir à la figure 3. *1*.

"La figure 4. *1* est encore une Crevette que l'on doit rapporter au sous-genre Amphithoe, *Ampithoë* de M. Leach, et qui est très-voisine de deux espèces décrites par Montagu sous le nom de *Cancer Gammarus rubricus* (2), et par Pallas sous celui d' *Oniscus cancellus* (3); M. Savigny l'a mentionné (4) sous le nom de *Cymadusa filosa*.

"La figure 4. *2* représente de profil et au trait une portion de ce crustacé: on a découvert les flancs pour montrer les espèces de lamelles qu'ils renferment; la figure 4. *3* est une de ces lamelles isolée.

"La figure 5. *1* appartient au même genre, et représente peut-être la même espèce, ou bien une variété de sexe. On pourroit croire aussi que la partie postérieure de son corps, qui est tronquée brusquement en dessus, est un caractère spécifique; on retrouve ce caractère dans le *Cancer rubricatus* de Montagu.

"La figure 6. *1* appartient au même genre: cette espèce paroît distincte; elle est plus petite que les deux précédentes. Nous proposerons de lui donner le nom de M. Ramond, *Amphithoë (Gammarus) Ramondi*.

"Genre Talitre, Talitrus. Fig. 7, 8 et 9."

"La figure 7. *1* est une espèce d'assez petite taille (7. *1*), et qui offre les caractères du sous-genre Orchestie, *Orchestia* de M. Leach; mais on doit la distinguer de l' *Orchestia littorea* de cet auteur, ou le *Cancer littoreus* de Montagu; nous lui donnerons le nom de Montagu, *Orchestia Montagui*. Les figures 8. *1* et 9. *1* sont des Talitres qu'on peut rapporter aussi au sous-genre Orchestie, à cause de la dissemblance des pieds et du développement de la seconde paire. Ces espèces nous ont paru nouvelles: la première sera dediée à M. Deshayes, *Orchestia Deshayesii*, et la seconde à notre ami, le docteur Jules Cloquet, *Orchestia Cloquetii*."

The reference (2) is to "Montagu. Linn. Trans. tome ix. pag. 99. pl. v. fig. 1; et *Encyclop. méthod.* pl. cccxxxvi. fig. 33." The reference (3) is to "Pallas, *Spicil. zool.* fascic. ix, pag. 52, tab. iii., fig. 18." The reference (4) is to Savigny, Mémoires.

1825. Blumenbach, Johann Friedrich, born 1752, died 1840 (Encycl. Brit., 9th Edition).

Handbuch der Naturgeschichte. Eilfte rechtmässige Ausgabe. Göttingen, 1825.

In the preface a protest is raised against the use, affected by zoologists and botanists, of the word *Gattung* to mean *genus*, contrary to the older use of *Geschlecht* for *genus*, and *Gattung* for *species*.

While following in general the system of Linnæus, Blumenbach agrees with the recent French systematists in separating "die Spinnen- und Krebsartigen Insecten, so wie die Tausend-

füsse etc.," from the Aptera proper. In Suborder A, Arachnidea, it may be noticed that he includes "*Phalangium Balænarum*, die Wallfischlaus. P. abdomine dilatato muricato, rostro subulato. Pennant's *British Zoology*. P. iv. tab. 18. fig. 7." In Suborder B, Crustacea, he gives *Cancer* divided into three Families, Brachyuri, Parasitici, Macrouri, the first with six, the second with one, the third with eight species. The 14th species is thus given:—

"*Pulex*. (Gammarus *P.* F.) die Fluss-Garneele. C. macrourus articularis, manibus 4 adactylis, pedibus 10. Rösel vol. III. tab. 62.

"Zumahl häufig in der Brunnenkresse. Aber auch in Unzahl an manchen Seeküsten. Sehr gefräßig, Aas verzehrend."

The genera *Monoculus*, *Oniscus*, *Scolopendra* and *Iulus*, complete the Crustacea. *Oniscus* has for its first species:—

"*Ceti*. (Cymothoa *C.* F.) die Wallfischlaus. O. ovalis, segmentis distinctis, pedibus tertii quartique paris linearibus ovaticis.

"Pallas *spicileg. zoolog.* Fasc. IX. tab. 4, fig. 14.

"Zumahl eine Plage der Wallfische, bey welchen dieses Insect, besonders an den Finnen und Zeugungstheilen, aufs festeste sich einnistelt."

1825. De Brébisson, L. Alphonse, born 1798 (Hagen).

Catalogue Méthodique des Crustacés terrestres, fluviatiles et marins, recueillis dans le département du Calvados, lu a la séance du 14 mars 1825; Par M. De Brébisson. Société Linnéenne du département du Calvados. pp. 225–270. Caen, 1825.

In the introduction de Brébisson promises a similar work "sur la classe des Arachnides et sur celle des Insectes," if the years which are accumulating so rapidly on his head, leave him time for it. This seems an odd expression for a man of twenty-seven, which would be his age at this time according to the date of his birth given by Hagen. Further on, in treating of the difficulties of obtaining specimens of marine Crustacea, he says, "En effet, comment parvenir à connaitre celles dont l'existence semble être confinée aux plus grandes profondeurs de l'Océan?" To this question the Challenger and similar expeditions have at least begun the answer.

In "Ordre 3, les Amphipodes. *Amphipoda*," he gives, with short descriptions of the genera and species, *Gammarus pulex*, Fab. Lat. etc.; *Talitrus locusta*, Lat. Lamk.; *Talitrus gammarellus*, Lat. Lamk., Bosc, etc., the species now generally accepted as *Orchestia gammarellus*; *Melita palmata*, Montagu, sp.: *Corophium longicorne*, Lat. Lamk.

"Order 4. Les Isopodes. *Isopoda*," begins with Chévrolle, *Caprcola*, Lat. Lamk., *Caprella* being intended. The species given is "C. Linearis. Lat. (*C. Scolopendroides*. Lamk.—*Cancer*. Lin.)." Then follow *Anceus*, Risso, *Jone*, Leach, *Sphæroma*, Lat., &c.

1825. Desmarest, A. G.

Considérations générales sur la classe des Crustacés, et description des espèces de ces animaux, qui vivent dans la mer, sur les côtes, ou dans les eaux douces de la France. Ouvrage orné de cinquante-six planches en taille-douce représentant cent quarante genres de Crustacés. Paris. Strasbourg, 1825.

This very useful history of the Crustacea in general discusses, in the first eighty-two pages, their position in the scale of beings, their structure, functions, habits, and utility, together with

a brief review of the systems successively adopted for their classification. The sixth chapter, containing this review, is admirably illustrated by five "tableaux synoptiques," which precede the plates at the end of the volume.

In Chapter VII. Desmarest gives notice that in his own classification of the Crustacea he proposes to follow essentially that inserted by Leach in the eleventh volume of the Linnæan Transactions, but modified and expanded to adapt it to the improved state of science on the subject. He had already explained in the preface that he had improved Leach's system by grafting upon it that of Latreille. Accordingly, he makes two subclasses, the Malacostraca and the Entomostraca, each divided into five orders. The Malacostraca are divided into two legions, of which the first, the Podophthalma, includes two orders, the Decapoda and Stomapoda; the second, the Edriophthalma, contains three orders, the Amphipoda, Læmodipoda, and Isopoda. As usual at this period, the mandibular palp comes into the definition of the Amphipoda, and is denied to the Læmodipoda. The Amphipoda are said to have *five* pairs of false feet under the tail.

The distribution of the Amphipoda is as follows:—

"Ire Section. *Deux antennes insérées une de chaque côté du front; queue terminée par des filets styliformes; tête grosse, verticale.*"

This includes *Phronima*, with the species *sedentaria* and *custos*.

"IIe Section. *Quatre antennes; deux feuillets aplatis, servant de nageoires, placés au bout de la queue, et remplaçant les styles; tête grosse, verticale.*" Herein he places *Hyperia*, Latr. "Quatre antennes sétacées. Les dix pieds, proprement dits, médiocrement longs, et tous terminés par un article simple et pointu. Tête assez petite, ronde, plane en devant, point prolongée en rostre. Corps conique, terminé par deux lames triangulaires, alongées, horizontales. *Hyperie de Lesueur; Hyperia Suerii*, Latr.; *Phronima?* ejusd., Encycl. Mét. Crust., tab. 328, fig. 17 et 18. *Nota.* Je dois la communication des caractères de ce genre inédit à la complaisance de M. Latreille, son fondateur." In this section he also places "PHROSINE (*Phrosine*, Risso; *Dactylocerus*, Latr.)," with the species *Phrosine semilunata* and *Phrosine macrophthalma*.

"IIIe Section. *Quatre antennes; queue terminée par des filets styliformes; tête médiocrement grosse, non verticale.*

"Ire Division. *Antennes formées de quatre articles dont le dernier est subdivisé en plusieurs autres fort petits; les supérieures très-petites et plus courtes que le pédoncule des inférieures, qui est composé de trois articles.*" *Talitrus* with the species *locusta*, and *Orchestia* with the species *littorea* occupy this division.

"IIe Division. *Antennes grandes, sétacées, formées de quatre articles dont le dernier est lui-même multiarticulé; les supérieures de bien peu plus courtes que les inférieures.*" This division has only *Atylus*, Leach, with the species *carinatus* of Fabricius. But the remark is added, "M. Latreille présume que le *Gammarus nugax* de Fabricius, figuré par Phipps (Voyage au pôle boréal, pl. 12, fig. 2), appartient au genre Atyle."

"IIIe Division. *Antennes formées de trois articles dont le dernier est multiarticulé, et dont le premier est le plus petit de tous; les supérieures étant les plus longues.*" The genus *Dexamine* is included, with the species *spinosa*, and this is followed by "LEUCOTHOÉ (*Leucothoe*, Leach; *Gammarus*, Latr.; *Cancer*, Montagu; *Curieria*, Leach)," with the species *articulosa*, but no explanation is given to show where the synonym *Curieria* for the genus is to be met with.

"IVe Division. *Antennes formées de quatre articles, dont le dernier est multiarticulé; les supérieures étant les plus longues.*

"*Subdivision I. Les quatre premiers pieds monodactyles; ceux de la seconde paire dans les mâles, ayant la main dilatée et comprimée.*" In this subdivision is included "MÉLITE (*Melita*, Leach; *Gammarus*, Latr., Lamck.; *Cancer*, Montagu; *Boscia*, Leach)," with the species *palmata*, and "MAERA (*Mæra* Leach; *Gammarus*, Latr., Lamck.; *Mulleria*, Leach), with

the species *grossimana*. Whence he derives the names *Boscia* and *Mulleria* he does not explain. He adds in a note that probably *Gammarus crassimanus*, Viviani, belongs to the genus *Mæra*.

"*Subdivision II. Pieds des deux premières paires monodactyles et semblables dans les deux sexes.*" In this are included three genera, "CREVETTE (*Gammarus*, Fabr., Latr., Lamck., Leach; *Squilla*, Degéer; *Cancer*, Linn.; *Carcinus*, Latr.)," with the species *Gammarus pulex*, Fabr., Latr.; *Gammarus marinus*, Leach; *Gammarus locusta*, Leach; and *Gammarus campylops*, Leach. Among the synonyms of *Gammarus pulex* may be mentioned, "*Squilla fluviatilis*, Merret, Pin., pag. 192." Of *Gammarus locusta*, he says, "M. Surriray, du Havre, a remarqué qu'elle est phosphorescente." The next genus, *Amphithoe*, has the species *rubricata* of Montagu and *cancellus* of Pallas. The third genus is *Pherusa*, with the species *fucicola*.

"Ve Division. *Antennes composées de quatre articles; les inférieures étant les plus longues et pédiformes; les quatre pieds antérieurs monodactyles.*

"*Subdivision I. Pieds de la seconde paire pourvus d'une grande main; antennes inférieures de bien peu plus longues que les supérieures.*" *Podocerus* with the species *variegatus*, *Jassa* with the species *pulchella* and *pelagica*, are the genera included, *Corophium*, Latr., being given as a synonym to each.

"*Subdivision II. Pieds de la seconde paire n'ayant pas la main dilatée; antennes inférieures bien plus longues que les supérieures.*" *Corophium*, with the species *longicorne* and its accustomed synonyms, stands here alone.

"VIe Division. *Les quatre antennes très-grandes et fortes, presque aussi longues les unes que les autres; les supérieures formées de quatre articles, et les inférieures ou latérales, de cinq.*" *Cerapus*, Say, with the type species *tubularis*, occupies this division.

In a note Desmarest here gives an account of several genera as probably belonging to the Amphipoda, though from want of figures and sufficient description remaining doubtful. These are *Lepidactylis*, Say, with the species *dytiscus*; *Lanceola*, Say, with the species *pelagica*; *Sperchius*, Rafinesque, with the species *lucidus*, and a complaint that Rafinesque should have chosen a name for his genus so near to *Sperchæus* employed by Fabricius among the Coleoptera; *Lepleurus*, Rafinesque, with the species *rivularis*; *Pisitoe*, Rafinesque, with the species *bispinosa* and *lævifrons*. "Enfin, un genre nommé AEROPE, appartenant aussi à l'ordre des amphipodes, a été crée par M. Leach; mais il m'est inconnu, et M. Savigny a figuré (dans ses Mém. sur les anim. sans vert., Ire part., Ier fasc.), les parties de la bouche des deux autres, qu'il nomme CYMADUSA et LYCESTA. Ce dernier me paroit très voisin du genre MAERA de M. Leach."

The fourth order, *Læmodipoda*, Latr., is distributed as follows:—

"Ire Section. *Corps très-etroit et linéaire; des yeux composés situés en arrière des antennes supérieures; point d'yeux lisses; antennes supérieures ayant le dernier article aussi long que tous les autres ensemble; les inférieures un peu comprimées; pieds en nombre variable; main de ceux de la seconde paire souvent dentée en dedans.*" To this section he assigns *Leptomera*, Latr., Lamck., with *Squilla ventricosa*, Müller, for type, observing that Latreille founded this genus only upon published figures, and referred to it, besides Müller's species, which has no vesicular appendages figured at the bases of the legs, also Slabber's species, "qui a un appendice en forme de lobe, à tous les pieds, les deux premiers exceptés," and Montagu's *Cancer pedatus*, "qui en a tous les pieds pourvus, moins ceux de la prèmiere et des trois dernières paires." To the same Section he assigns "PROTON (*Proto*, Leach, Latr.; *Squilla*, Muller; *Leptomera*, Lamck.). Dix pieds disposés dans une série continue depuis la tête jusqu'au quatrième anneau inclusivement, le corps étant terminé par deux ou trois articles, qui forment une espèce de queue," etc., with the type species, "LE PROTON PEDIAIRE, *Proton pedatum*, Nob.; *Squilla pedata* de Muller." Though Desmarest says he had himself found it in abundance at Havre, there can be no

doubt that the account is based on imperfect specimens of *Proto rentricosa*, O. F. M. Lastly, in this section he places *Caprella*, Lamck., with the species *acutifrons*, Latr.; *aruminifera*, Leach, (more correctly, *acanthifera*, Leach); *linearis*, Linn.; "*mantis*, Latr., Nouv. Diction. d'Hist. nat. Tête alongée, rétrécie postérieurement; pieds de la seconde paire plus courts que ceux de l' espèce précédente, avec leurs articles inférieurs comprimés et anguleux. Des côtes de la France baignées par l'Océan"; a species which Mayer considers quite indefinite; *phasma*, Lamck., with *Cancer phasma*, Montagu, for a synonym, this being *Protella phasma*. He concludes by remarking that, "M. Latreille regarde encore comme appartenant à ce genre le *Cancer filiformis* de Linnæus, et le crustacé décrit par Forskal, Faun. Arab., pag. 87, comme une larve d'insecte d'un genre incertain."

"IIe Section. *Corps large, déprimé; des yeux composés, et en outre deux très-petits yeux lisses disposés transversalement sur le vertex; antennes très-rapprochées à leur base; pieds au nombre de quatorze, dont dix parfaits, et quatre (placés sous le second et le troisième segment du corps), en forme d'appendices grêles, articulés, ou de fausses pattes; anus avancé et pourvu de tubercules peu saillans.*" This section has the one genus *Cyamus*, Latr., with the species *ceti*. The various synonyms of the genus and species are given, followed by the remark, "de l'Océan d'Europe où il vit sur les baleines, et aussi, selon M. Latreille, sur les scombres ou maquereaux. Ce crustacé est vulgairement désigné par le nom de pou de baleine."

In the fifth order, *Isopoda*, Latr., "Ire Section. Branchies placées sous la queue," etc., he defines the first division thus:—

"Ire Division. Pieds au nombre de dix seulement; corps formé de trois, cinq ou sept segmens; abdomen (ou queue) en ayant quatre, cinq ou six, et terminé par deux ou quatre lames latérales; deux ou quatre antennes." In this division he places the genus, now transferred to the Amphipoda, *Typhis*, Risso, with the species *ovoides*, Risso, remarking as to the definition of the genus that "M. Risso n' annonce comme didactyles que les deux premiers pieds; MM. Latreille et de Lamarck indiquent les deux suivans comme présentant le même caractère." Under the genus "*Jone*, Latr.," in the Second Division, Desmarest remarks that Latreille (Encycl. Méth., Expl. des pl.) considers Slabber's *Oniscus arenarius* suited to form a genus near to *Ione*, but Desmarest himself, though he thinks that Slabber's species has only twelve feet, shows that it is at any rate quite remote from *Ione*.

Pages 396–420 are occupied with a valuable Bibliographie carcinologique. Pages 421–427 contain a supplementary account of various species described by Risso, but not easily to be identified or classified. Among these are his *Talitrus rubropunctatus*, which Desmarest thinks may be an *Orchestia*, and his *Caprella punctata*, which Mayer agrees with Desmarest in thinking quite indefinite.

Figures of Amphipoda, borrowed from various sources, are given on plates 45 and 46. Fig. 1 on plate 45 is described at the foot of the page as "Phronime *sédentaire, gr. nat.*" Yet it has evidently been copied with some care from Pl. 2, fig. 3, of Risso's Hist. Nat. des Crust. des Environs de Nice, 1816, which represents Risso's *Phronima custos*, a species, it is true, identical with *Phronima sedentaria*, but none the less distinguished from it by Desmarest, who remarks upon it, "Pattes natatoires caudales paroissant n' être qu' au nombre de quatre," a mark of distinction which beyond doubt belongs to the figure only, and not to the species. Desmarest's fig. 8, on pl. 45, of "Crevette *des ruisseaux, gross.*," is no longer that of Rösel's species, but no doubt taken from an actual *Gammarus pulex*.

1825. Eschscholtz, Johann Friedrich, born 1793, died 1831 (Hagen).

Uebersicht der zoologische Ausbeute während der Reise von Kronstadt bis St Peter und Paul. Mit Abbild. Isis. 1825. pp. 733–746.

This work is included in Boeck's list, but I can find nothing in it relating to the Amphipoda.

1825. Latreille, P. A.

Familles naturelles du Règne Animal, exposées succinctement et dans un ordre analytique, avec l'indication de leurs genres. Paris, 1825.

Latreille here divides animals into three great series or divisions, 1. Les *Vertébrés* ou *Spinicérébraux*. 2. Les *Céphalidiens*. 3. Les *Acéphalés*. The last two include the invertebrates. The *Céphalidiens* he divides into three races, "les mollusques, les elminthodes et les condylopes." Of the condylopes the "première branche" is "Les Hyperhexapes, *Hyperexapi*. (Apiropodes, Sav.)." The première classe is *Crustacea*. Of these the première section is *Maxillosa*, with nine orders, Decapoda, Stomapoda, Læmodipoda, Amphipoda, Isopoda, Lophyropoda, Phyllopoda, Xyphosura, Siphonostoma. Of the third of these orders, "Læmodipodes. *Læmodipoda* (Isopodes cystibranches; Cuv., *Règne Animal*, tom. 3, pag. 50.)," he says, "la tête étant confondue avec le premier segment du tronc, tandis que dans les deux ordres suivans elle en est séparée, nous commençons par celui-ci; autrement la série naturelle des amphipodes et des isopodes serait interrompue." Of the Crustacés sessiliocles he had already said in the preface, page 24, "ils composent l'ordre des *amphipodes* et ceux de *læmodipodes* et *d'isopodes;* on aurait pu les réunir en un." This latter opinion has not met with acceptance in its entirety, but the Læmodipoda are now by general consent united with the Amphipoda. Latreille here forms them into two families, the first, Ovalia, with the genus *Cyame*, the second, Filiformia, with the genera *Cherrolle*, *Proton*, *Leptomère*. To the Amphipoda he gives four families, the first, Crevettines, *Gammarinæ*, contains in groups the genera Cérape, Leucothoé; Mélite, Amphithoé, Dexamine, Crevette, Phéruse; Orchestie, Talitre, Atyle; Corophie, Podocère, Jasse; Phronime. The three remaining families are given as follows:—

"Seconde Famille. Uroptères. *Uroptera*. Les appendices latéraux de l'extrémité postérieure de leurs corps sont en forme de feuillets et servent de nageoires. Ces crustacés avoisinent les *cymothoa*. Les g. Hypérie, Phrosine (Riss., Desm.; *Dactylocère*, Latr. *manuse.*). 2. Ceux-ci n'ont plus que dix pieds et ne composent qu'une seule famille.

"Troisième Famille. Decempèdes. *Decempedes*. Les g. Typhis, Ancée, Pranize (*Oniscus cæruleatus*, Montag.; Atlas de l'Encycl. méthod., pl. 336, fig. 28, et pl. 329, fig. 24). II. Les autres et derniers amphipodes ont tous leurs pieds (quatorze) ou les quatre derniers au moins simplement natatoires et mutiques.

"Quatrième Famille. Hétéropes. *Heteropa*. Les g. Apseude, Ione (*Calino*, Léach). Ptérygocère."

1825. Latreille, P. A.

Encyclopédie Méthodique. Histoire Naturelle. Entomologie ou Histoire Naturelle des Crustacés, des Arachnides et des Insectes, Par M. Latreille. Tome Dixième. Par MM. Latreille, Le Peletier de Saint Fargeau, Serville et Guérin. A Paris, M.DCCCXXV.

The articles on Amphipoda signed by Latreille in this volume are to be found under:—

"1. Puéruse. *Pherusa*. Leach," as to which he does not supplement the scanty information which Leach supplies.

2. Phytibranches, *Phytibranchia*. Of these he says, "dans l'ouvrage sur le règne animal de M. Cuvier, j'ai designé ainsi une famille de Crustacés, de l'ordre des Isopodes, dont les appendices branchifères situés sous la queue ressemblent à de petits pieds articulés ou à des

tiges ramifiées, tandis que ceux des autres Isopodes sont en forme de lames ou d'écailles. Ayant, depuis l'impression de cet ouvrage, observé des palpes aux mandibules de divers Phytiphages [Phytibranches], caractère qui distingue les Amphipodes des Isopodes, j'ai transporté cette tribu dans le premier de ces deux ordres. Les autres Amphipodes ayant d'ailleurs sous le post-abdomen des appendices d'une forme analogue, ce groupe ordinal n'en est que mieux assorti. Je le divise en quatre familles." These are 1. Les CREVETTINES, *Gammarinæ*, with the genera "*Crevette, Talitre, Corophie, Phronime* et plusieurs autres établis par M. Léach.;" 2. "Les UROPTÈRES, *Uroptera*. Semblables aux précédens par la manière dont se terminent leurs pieds et par leur nombre, mais dont le corps offre à son extrémité postérieure et latérale des appendices en nageoires. Le genre *Phrosine* de M. Risso et quelques autres inédits appartiennent à cette famille." 3. "Les DÉCEMPÈDES, *Decempedes*. Les pieds sont onguiculés, mais réduits à dix. Elle se compose des genres *Typhis, Anée, Pranize*." 4. "Les HÉTÉROPES, *Heteropa*. Les pieds sont au nombre de quatorze, comme dans les deux premières familles, mais tous, ou les quatre derniers au moins, sont mutiques et simplement natatoires. Là se placent les genres *Apseude, Ione, Pterygocère*." Remarks follow in regard to *Anceus, Praniza, Apseudes* and *Ione*, concluding with the observation "le genre PTÉRYGOCÉRE a été établi sur une figure de Slabber copiée ici, pl. 330, Nos. 3 et 4. *Voyez* cet article et celui de TIPHIS [Typhis]."

3. PODOCÈRE. *Podocerus*, Leach, as to which he says, that it might be united to *Corophium*, by this observation leading up to the introduction of a long letter from M. d'Orbigni in regard to the habits of *Corophium grossipes*.
4. "PTERYGOCÈRE, *Pterygocerus*. Genre de Crustacés que j'ai indiqué à l'article Phytibranches de cet ouvrage, et qui est formé d'après la figure de l'*Oniscus arenarius* de Slabber. (*Observ. microscop. tab. XI. fig.* 3. 4). Quoique nous n'ayons point vu cet animal en nature, il nous paroit cependant qu'on ne peut le rapporter à aucun genre de Crustacé connu. Ses quatres antennes sont très-garnies de poils barbus ou formant des pinnules aux premiers articles qui sont beaucoup plus grands que les autres. Les quatre pattes postérieures présentent les mêmes caractères; les quatre premières, ou du moins celles qui semblent l'être d'après la figure, sont velues, courbes, et se terminent par une nageoire ou un article arrondi et mutique. L'extrémité postérieure du corps est terminée par plusieurs appendices ou styles velus. Ce Crustacé doit appartenir à l'ordre des Amphipodes ou à celui des Isopodes."

1825. GUÉRIN (later GUÉRIN-MÉNEVILLE), Félix Édouard, born 1799, died 1874 (Webster).

Encyclopédie Méthodique, &c. Tome Dixième, &c. A Paris M.DCCCXXV.

Latreille's health having failed before the completion of this volume, the remaining articles on the Amphipoda were entrusted to Guérin. This author wishing to bring the Encyclopædia up to the level of knowledge then existing on the subject, subjoins to those species which he is able to mention in their alphabetical order, the notice of various others in the best grouping he can contrive. Under the heading PROTON are given four articles, 1. "PROTON, *Proto*. Léach. Lat. *Squilla*, Muller. *Leptomera*. Lamk." 2. "LEPTOMÈRE, *Leptomera*. Lat. Lamk. *Proto?* Léach." 3. "CHEVROLLE, *Caprella*. Lamk. Lat. Léach. *Cancer*. Linn. *Gammarus*, Fab." 4. "CYAME, *Cyamus*. Lat. Lam. *Oniscus*. Pallas. *Squilla*. De Géer. *Pycnogonum*. Fab. *Larunda. Panope*. Léach." No new information is contributed. Rafinesque's PROTONIA is next mentioned, but Guérin says he knows nothing about it. An account is given of "TALITRE, *Talitrus*. Lat. Bosc. Léach. Lamk. *Cancer*. Montagu. *Oniscus*. Pallas," with the species "*Talitrus locusta*, Lat. Léach. Desm.," and various synonyms. This is followed by "ORCHESTIE, *Orchestia*, Léach. Latr. (*Fam. nat.*) *Talitrus*. Lat. Bosc. Riss. Lamk. *Oniscus*. Pallas," with the species "*Orchestia gammarella*, Lat.," and its

synonymy. Next is given "Atyle, *Atylus*, Léach. *Gammarus*. Fab. *Talitrus*, Lat.," with the species *Atylus carinatus*, Léach, having for synonym *Gammarus carinatus*, Fab. The remark is made that "Risso describes a species of Talitrus (*T. rubropunctatus*) which might well belong to the genus Atylus."

"Typhis, *Typhis*, Risso, Lat. Lamk." is described in accordance with the views of Latreille among the *Decempedes*, where it is placed in company with *Anceus* and *Praniza*.

Under "Uroptère, *Uroptera*. Lat.," the genus *Hyperia*, Lat., is described. Desmarest is referred to for the species "*Hyperia Succii*." Montagu's descriptions of "*Cancer gammarus Galba*" and *Cancer monoculoides*, are translated in the belief that these species either belong to the genus *Hyperia* or come very near it. *Phrosina*, Risso, is next described, and Risso's accounts given of the two species *Phrosina semilunata* and "*Phrosina macrophtalma*." Guérin's own genus *Themisto* follows, being very fully described, with *Themisto Gaudichaudii* for the type species. The account was repeated with but slight variation in a separate memoir in 1828. See note on Guérin under that date. In the Encyclopædia Guérin appends to his description of *Themisto*, one of "Rhoé, *Rhœa*. Milne Edw.," observing, "à la suite des Uroptères, nous devons faire mention d'un nouveau genre que vient d'établir M. Milne Edwards dans les *Annales des Sciences naturelles*. Ce naturaliste pense qu'il forme le passage entre les Amphipodes et les Euphées de M. Risso, que M. Latreille réunit à son genre Apseude. M. Edwards croit qu'en modifiant un peu les caractères de la famille des Uroptères, son genre s'y placera aisément et d'une manière naturelle." Lastly Guérin gives "Zuphée. *Zuphæa*. Risso," and "Hexone, *Hexona*. Risso," but he is not able to add anything to Risso's statements about them. The volume ends with an alphabetical table of the articles which come into the dictionary not in their alphabetical order. Here Chévrolle appears as Chevralle, Cyame as Cyane, Hypérie as Hyspérie. Phrosine and Themisto are not mentioned.

1825. Savigny, Jules-César.

Description de l'Égypte, publiée par les ordres de sa Majesté l'Empereur Napoléon-le-grand. Histoire Naturelle. Animaux articulés. Crustacés. Pl. XI. dessiné et gravé en 1805–1812.

The illness of Savigny prevented him from writing the text to his elaborate Plates. After waiting for many years, the French Government at length entrusted the task to Victor Audouin. The brief account which he gave of the Amphipoda is quoted in the Note on Audouin, 1825. It may here be mentioned that 2. *Lycesta furina*, Savigny, is now known as *Leucothoë furina*; 3. *Gammarus Fresnelii*, Audouin, is now called *Melita Fresnelii*; 4. *Cymadusa filosa*, Savigny, is now called *Amphithoë filosa*; 6. retains the name *Amphithoë Ramondi*, Audouin, but is not easily to be distinguished from *Amphithoë filosa*, except that it has the ocular lobe of the head more sharply produced between the antennæ; 5. which is not positively named by Audouin at all, though he hints at *Amphithoë rubricata*, Montagu, resembles *Amphithoë filosa* and *Amphithoë Ramondi*, except that the wrist in the first gnathopods is longer in proportion to the hand, the hand of the second gnathopods is rather densely setose on the anterior margin, and the third joint of the peduncle of the upper antennæ is by comparison elongate. 7. *Orchestia Montagui*; 8. *Orchestia Deshayesii*; and, with some authors, 9. *Orchestia Cloquetii*, retain the names assigned them by Audouin. *Orchestia Cloquetii*, the figure of which has met with some mishap in the British Museum Catalogue, was placed by Guérin-Méneville in one of his divisions of the genus *Talitrus*. Savigny's figure of it is here reproduced. It will be seen by the position of the larger

gnathopods that they are probably the first pair, not the second as has been hitherto supposed. The large fourth joint must be the wrist not the hand. The finger is not shown. Judging only by the general appearance, in the absence of other evidence, one may reasonably assign the species rather to *Talitrus* than to *Orchestia*. In fig. 1, which repre-

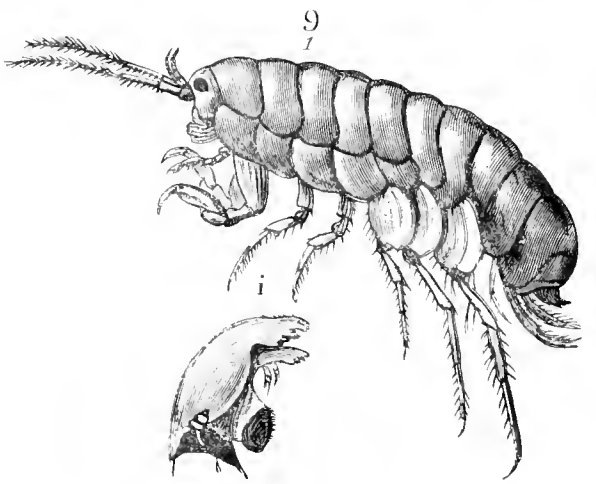


Fig. 21.

sents the mandible of *Orchestia Montagui*, here reproduced, it will be seen that Savigny represents the rudiment of a triarticulate palp. In his figure of the maxillipeds of the same species he represents the outer plate as articulated with the joint of which it is the expansion. This must be an error.

1826. Risso, A.

Histoire Naturelle des principales productions de l'Europe Méridionale et particulièrement de celles des environs de Nice et des Alpes Maritimes. Tome cinquième. Paris, 1826.

In the preliminary notice Risso observes that "tous les genres d'amphipodes aiment à se laisser balancer mollement par les vagues sur la surface des eaux," a statement which must be received with some reservation in regard to the Orchestidæ and others. The crustacés amphipodes here form the third Order. Genera and species, which had been already described in Risso's earlier works, are nevertheless here marked as new, sometimes without a reference to the earlier description. The genus *Phrosina* has the following fresh definition ;—"Corps assez solide, oblong ; tête moyenne ; dix pattes, toutes monodactyles ; dernier article de la queue arrondi, sans appendices." The expression "sans appendices" is intended to distinguish *Phrosina* from *Phronima*, in which Risso fancied that the telson had appendages. The genus *Typhis* is re-described :—"Corps solide, ovoide ; tête large ; dix pattes, la première paire didactyle ; dernier article de la queue conique, aigu, sans appendices." A new species, named *Gammarus marinus*, is thus described "corpore subovato, intense griseo ; punctulis saturate griseis ornato ; antennis pedibusque pallidioribus." The name being preoccupied by Leach, and the description very inadequate, this species has been allowed to drop by subsequent authors. Under the heading "les antennes supérieures presque aussi longues que les inférieures," the new genus *Enone* is described :—

"Corpus elongatum, compressum, articulatum; styli caudales inferiores, superioribus longiores; oculi magni, reniformes; antennæ superiores articulo primo elongato, secundo quintuplo longiore, articulis aliis minutissimis; antennæ inferiores articulo primo breve, secundo valde elongato, articulis aliis exiguissimis; pedes æquales, monodactyli," with the type species *Enone punctata*, "Corpore hyalino, lutescente, lateribus rubro punctatis; chelis minimis; pedibus, secundo pari, longissimis, apice ovatis, acutis." This is obviously Risso's *Talitrus rubropunctatus* of 1816. Without noticing this synonym, the British Museum Catalogue names it *Allorchestes punctatus*, as a doubtful species, and with the alternative suggestion that it may be the young of *Amphithoë rubra*; but the description of the antennæ and gnathopods excludes both these identifications. Guérin, 1825, suggests the genus *Atylus* for the species *rubropunctatus*. It is characteristic of Risso that while in the generic description he gives "tous les pieds égaux, monodactyles," in the specific account we find "la première paire de pattes grêle, courte; la seconde fort longue; les autres longues et égales." The species was found in the spring, far from the shore, the female carrying transparent eggs. He says of the animals of this genus (p. 100), that they "restent toujours en pleine mer, et on les voit souvent sautiller à la surface de l'eau pendant les fortes chaleurs." This does not favour Guérin's suggestion above-mentioned.

Talitrus niræensis, n. s., is described as "corpore glaberrimo, hyalino, vitreo, pellucido; oculis purpureo-nigris: antennis, pedibus tarsisque violascentibus." This pellucid species, more likely to be one of the *Hyperina* than a *Talitrus*, might, one would think, be identified and more fully described by some one residing at Nice or in the neighbourhood. The same may be said of *Atylus coralliinus*, n. s., which Spence Bate believes to be probably *Dexamine spinosa*. The genus *Euphœus*, Risso, is thus re-described, "Corpus elongatum, postice gradatim acuminatum; caput quadratum; oculi globosi; tentacula duo filiformia, multiarticulata; thorax quinquearticulatus, segmento anteriore majore, filamentis duobus corpore longioribus instructus," with the type species *Euphœus ligioides*, of which its author says, "le corps de cette espèce est composé d'un segment assez large, rattaché à cinq autres plus étroits, qui sont suivis d'un même nombre plus petits, le dernier termine par deux courts appendices garnis chacun d'un long filet très mince; la tête est tronquée au-devant; l'œil petit, noirâtre; les antennes inegales; les quatre paires de pattes sont ciliées; une belle teinte jaune, blanche et verdâtre le colore de toute part." Risso fancies that the genus has much in common with *Ligia*. Bate and Westwood, following the lead of Desmarest, make it a synonym of *Apseudes*, Leach, in the Tanaidæ, among their *Isopoda aberrantia*.

The Crustacés Lémodipodes form the fourth Order. The first section includes *Caprella*, with the species of his earlier work, "*C. linearis*" and "*C. punctata*," and *Nymphon*, Leach, with a new species "*N. arachnoideus*," quite out of place in this group. The second section includes *Pycnogonum* (Fab.), *Ciame*, with a species "*P. ceti*, *C. de la baleine*," apparently a *Cyamus*, although the habitat assigned "sur les baleinoptères et les scombres" implies some confusion. It includes also the new genus *Hexoma*, "Corpus ovatum, postice abrupte acuminatum: thorax sexarticulatus; cauda subtrigona, quinque articulata; pedes sex æquales, unguibus curvatis, acutis, armati," with the species *Hexoma parasitica*. As its habitat is on *Bopyrus*, there seems to be little doubt that it is the male of *Bopyrus* which Risso had observed in its ordinary position. Another new genus included is *Zuphea* "Corpus oblongum, convexum; caput subtriangulare; oculi magni, convexi; thorax quinque articulatus, articulis integris, approximatis; cauda sex articulata, ultimo articulo elongato, triangulare; pedes sex æquales," with the species *Zuphea sparicola*, the habitat of which is sur les spares (gilt-head), "dans le sillon des nageoires dorsales." This, like the preceding genus, is probably an Isopod, the description corresponding with the *Praniza* form of the genus *Anceus*.

1826. Ross, Sir James Clark, born April 15, 1800, died April 3, 1862 (Encycl. Brit., 9th Edition).

Journal of a third voyage for the discovery of a north-west passage from the Atlantic to the Pacific; performed in the years 1824–25, in his Majesty's ships Hecla and Fury, under the orders of Captain William Edward Parry, R.N., F.R.S., London, MDCCCXXVI.

In the Appendix, which is separately paged, under "Natural History" is included a paper entitled "Zoology, by Lieutenant James Clark Ross, R.N., F.L.S.," pp. 91–120. He says that in his "brief notice of the Marine Invertebrate Animals brought home by the late Expedition, the generic arrangement of M. Le Chevalier de Lamarck (*Histoire Naturelle des Animaux sans vertèbres*) has been followed in every instance." On the Amphipoda his notes are as follows :—

"10. Caprella scolopendroides. Caprella scolopendroides. *Lam.* v. p. 174. Gammarus quadrilobatus. *Zool. Dan.* iii. p. 58, Plate 114, fig. 11, 12, Female (young?) Squilla quadrilobata. *Zool. Dan.* ii. p. 21, Plate 56, fig. 4, 5, 6, Male (young?) Squilla lobata. *Fabr. Faun. Groenl.* p. 248, No. 225. Was found abundantly at Port Bowen, but considerably larger than those from which Müller's drawings were taken, and nearly as large as the magnified figures. They also differ in having a great number of small spines along the back, which, however, were not observable on the young ones found attached to the antennæ of the females. They agreed in all other respects. I have therefore considered them to be of the same species, as it is probable that Müller's drawings were taken from the young.

"11. Cyamus ceti. Cyamus ceti, *Lam.* v. p. 176. Oniscus ceti. *Fabr. Fauna Groenl.* p. 253, No. 230. *Zool. Dan.* iii. p. 69, Plate 119, fig. 13–17. Found on a young whale, which was killed in June 1825, near Port Bowen.

"12. Gammarus Sabini. Gammarus Sabini. *Leach, in Ross's Voyage*, 8vo ii. p. 178. *Supp. to Parry's First Voyage*. p. cexxxii. Plate i. fig. 8–11. Found on the ice at Port Bowen, but not very abundantly.

"13. Gammarus loricatus. Gammarus loricatus. *Supp. to Parry's First Voyage*, p. cexxxi. Plate i. fig. 7. In the figure above referred to, each pair of antennæ appear to be placed on a peduncle, which is not the case. They were found in considerable numbers on the ice in Port Bowen.

"14. Gammarus boreus. Gammarus boreus. *Supp. to Parry's First Voyage*, p. cexxix. The specimens which I possess differ from Captain Sabine's description in having the superior antennæ as long as the head and six first segments of the body, and the antennæ, legs, and tail being fringed with most beautifully fine ciliæ, particularly the plates of the tail. The fifth, sixth, and seventh pair of legs increase successively in length, the fifth pair being the smallest. In all other respects my specimens correspond exactly with his description.

"15. Talitrus nugax. Gammarus nugax. *Supp. to Parry's First Voyage*, p. cexxix. Cancer nugax. *Phipp's Voyage*, Plate xii. fig. 3. By far the most numerous of the *Crustacea* inhabiting the Arctic Seas. The superior antennæ are shorter than the inferior, which, according to the arrangement followed in this notice, separates it from the genus *Gammarus*, where it has been inadvertently placed.

"16. Talitrus Edvardsii. Talitrus Edwardsii. *Supp. to Parry's First Voyage*, p. cexxxiii. Plate ii. fig. 1–4. Was found on the ice at Port Bowen in great numbers. The plate and description above referred to are very exact."

In regard to *Talitrus nugax*, see Note on Goës, 1865. In regard to *Caprella scolopendroides*, see Miers' opinion in Note on Miers, 1877.

1827-1828. JOHNSTON, GEORGE, born 1797, died 1855 (Hagen).

Contributions to the British Fauna. By George Johnston, *M.D., Fellow of the Royal College of Surgeons of Edinburgh.* The Zoological Journal, vol. iii. From January, 1827, to April, 1828. London, 1828, pp. 173–181, 490–491.

Under "(Class. Crustacea. Order. Heterobranchia. Sect. Amphipoda. Gen. Gammarus) Lamarck," he described "1. GAM. MACULATUS," from sea coast near Berwick, with the observation, "it belongs to Leach's restricted genus *Gammarus*, of which he has described four species. Three of these are well known to me. His *G. aquaticus* is common here, as everywhere else in our wells and ditches; the *G. locusta* swarms in the pools left on the recess of the tide; and the *G. marinus*, remarkable by its strongly ridged back, is frequently taken here, in great abundance, in the baskets used for catching crabs. Our animal is quite distinct from any of these, nor can it be the *G. Camylops*, which I have not seen, for that is characterized by having 'flexuous eyes,' a character not in the least applicable to our *G. maculatus*."

"2. GAM. PUNCTATUS." "*Hab.* Amongst confervæ in pools left by the tide, very common near Berwick. *Obs.* In the arrangement of Dr. Leach this is an *Amphithoë*. He describes one species, the *Cancer Gammarus rubricatus* of Montagu (Linn. Trans. ix. 99, tab. v. fig. 1), which differs from ours in the following particulars:—it is of a "reddish, or pale pink" colour; the eyes are crimson, in ours brown, and so dark that if not attentively examined they might be pronounced black; the hands have no notch or fissure between their articulations; and, if Montagu's figure be correct, the outline of the body is different. Moreover, in the description, Montagu makes no mention of the punctures on the dorsal portion of the segments, a character not likely to have escaped the notice of that excellent naturalist."

"3. GAM. DUBIUS," which Johnston at one time thought synonymous with *Pherusa fucicola*, Leach, but in *Gammarus dubius* "the basilar joint of the superior [antennæ is] longer than the second or third," and this species has "*arms* with nearly equal hands, monodactyle, oblong, not much dilated, and sparingly ciliated," whereas he observes, "in the figure of the *Pherusa fucicola* given in the Supplement to the Encyclopædia Britannica, the second joint of the superior antennæ is represented as elongated, the first pair of feet or arms filiform without any hand, and the hand of the second pair oval with a very small claw. There is also a considerable difference about the tail, the *Pherusa* having no terminal conical processes. Other distinctions might be mentioned, but those already specified seem of as high a value as many of those which divide the genera of Dr. Leach."

"4. GAM. NOLENS." "Hab. amongst confervæ, not rare. *Obs.* To the preceding species I gave the specific appellation *dubius*, since it seemed doubtful to which of the genera of Dr. Leach it ought to be referred; this I have named *nolens*, as it will arrange with none of them. It seems allied to the *Gammarus monoculoides* (Linn. Trans. xi. 5, tab. ii. fig. 3.) of Mr. Montagu."

He enumerates as also occurring at Berwick, "the *Talitrus Locusta* and *Orchestia littorea* of Leach," the *Mæra grossimana* and *Jassa pulchella* of the same author, "the *Gam. monoculoides* of Montagu," and "the *Corophium longicorne*," all of them in abundance.

At p. 490, the habitat of *Gammarus punctatus* is described.

The description of *Gammarus maculatus* is quoted by Bate and Westwood, vol. i. p. 339, who distinguish it from the later *Gammarus maculatus* of Lilljeborg, but can give no further clue to its identification. There can, I think, be little doubt that it is the same as *Gammarus* (*Gammaropsis*) *erythrophthalmus*, Lilljeborg, which must in that case receive the name *Gammaropsis maculatus*, Johnston. *Gammarus punctatus* is identified by Spence

Bate with his own *Amphithoë littorina*; both are by Boeck made synonyms of Rathke's *Amphithoë podoceroides*. All three should in my opinion fall into the synonymy of *Amphithoë rubricata*, Montagu. The description of *Gammarus dubius* is quoted by Bate and Westwood, vol. i. pp. 397–398. It seems likely to remain in the doubt in which both they and the author of the species left it. The description of the antennæ points to some species of *Calliopius* or *Amphithopsis*, but the two "papillæ," which seem to be meant for the telson, would be inconsistent with these genera. *Gammarus nolens* is likewise left among the doubtful species by Bate and Westwood, vol. ii. p. 19. It had been, without sufficient reason, re-named by White *Typhis nolens* and subsequently *Anonyx* (?) *nolens*. It is as likely to be the *Hyale nilssonii* of Rathke as any other species that I am acquainted with, but the description is not sufficiently definite to entitle it to displace Rathke's specific name.

1827. Meyer.

Supplemente zur Lehre vom Kreislaufe. 1 Heft. Mit 1 ill. Kupfert. Bonn, 1827.

Zenker, 1832, says that this author described the circuit of the blood and of vegetable sap more as a poet than a naturalist, maintaining that not only in the sap of plants, but also in the blood of animals monads are found, and that all trunks are zoophytes, inhabited by hamadryads. He quotes from him the following passages relating to *Gammarus pulex*:—

"Pag. 56: Globulos sanguinis, ait, recto pergere tramite et hoc (*i.e.* hanc directionem) ipsis utpote animalculis prudentibus ("*sinnigen thieren*") esse innatum.

"Pag. 69: *Succos Gammari Pulicis effusos in monades atque in globulos campanuliformes majores distribui, qui inter se plures haberent monades*, idem auctor narrat.

"Pag. 70 legitur: *Gammari P. corpore disrupto globuli succi duplicis generis profluunt. Majores campanulati lentius moventur, diversas versus directiones, minores monades velociter diversas sequantur regiones et varia velocitate, et sic plures flaminis instar!*

"Pag. 74. denique prodit auctor noster, *sibi ex Gammari extremitate* (*pede*) *abscissa in massa musculari* (?) *coræ acervum globulorum separatorum et cortice convolutatorum videre contigisse*, cujus rei libenter ipsi fidem habeamus, nam si phantasiæ lusibus obtemperemus, tunc omnia cernere possumus, quæ imaginatio nobis proponat."

Zenker's last observation would apply to his own ternary and quinary distribution of the parts of *Gammarus pulex*.

1828. Audouin, V., et Milne-Edwards, H.

Mémoires pour servir à l'histoire naturelle des Crustacés. Paris, 1829. Troisième Mémoire sur l'Anatomie et la Physiologie des Crustacés. Recherches anatomiques sur le système nerveux. Lues à l' Académie royale des Sciences. (Extrait des *Annales des Sciences naturelles*, mai 1828).

The authors here say, p. 115, "parmi les Crustacés des ordres inférieurs que nous avons examinés, ce sont les Talitres qui nous ont offert le système nerveux le plus simple et le plus uniforme. Le corps de ces animaux se divise en trois parties assez distinctes, la tête, le thorax et l'abdomen; mais chacune d'elles est formée d'anneaux qui ont entre eux la plus grande ressemblance, et dont le nombre total est de treize. Ces divers segmens présentent à leur face inférieure deux ganglions nerveux placés sur les côtés de la ligne médiane, et réunis

entre eux par une petite commissure transversale: chacun de ces petits noyaux communique avec celui du segment qui le suit et qui le précède, à l'aide d'un cordon médullaire, et fournit un certain nombre de nerfs qui vont se distribuer aux différentes parties du corps. Le volume de ces ganglions diffère peu dans les divers segmens; au thorax, cependant, ils sont un peu plus gros que dans l'abdomen. Enfin ils sont tous un peu aplatis et ont à peu près la forme d'un losange.

"Il existe donc dans le Talitre deux châines ganglionnaires parfaitement symétriques, distinctes dans toute leur longueur, réunies entr'elles par des commissures transversales, et offrant partout une disposition essentiellement la même. La première paire de ganglions, ou la céphalique, est remarquable par sa simplicité, et ne diffère pas essentiellement des ganglions qui suivent; elle est située, comme dans tous les animaux articulés, au dessus de l'œsophage, et fournit des nerfs aux yeux et aux antennes: ces ganglions que l'on a désignés à tort sous le nom de cerveau, se continuent postérieurement avec les cordons médullaires qui les unissent aux deux ganglions du premier anneau thoracique, en passant sur les côtés de l'œsophage, qu'ils embrassent. Ces derniers ganglions fournissent en dehors deux nerfs, dont l'un pénètre dans la patte correspondante, et dont l'autre paraît se distribuer principalement aux muscles et aux tégumens des parties latérales du corps. Les ganglions des autres segmens présentent la même disposition; seulement la distance qui les sépare nous a paru plus grande dans l'abdomen qu'au thorax." Pl. II. fig. 1 exhibits the "Système nerveux du Talitre."

The Report on this paper to the Académie Royale des Sciences by M. Geoffroy S.-Hilaire, "lu dans la séance du 25 février 1828," in describing the results of the investigations made by the two authors, declares the conclusion to be that "the nervous system of all the crustacea, whatever the differences it presents among the species of the various orders, is formed of the same elements: *the solitary nerve-nucleus of the crab being practically nothing but an agglomeration of the numerous nerve-ganglia* arranged longitudinally in the cray-fish and Talitrus."

1828. Guérin (afterwards Guérin-Méneville), F. É.

Mémoire sur le nouveau genre Thémisto, de la Classe des Crustacés; par M. F. E. Guérin. (Lu à la Société d'Histoire naturelle de Paris le 29 août 1828.) Extrait du tome iv. des Mémoires de la Société d'Histoire naturelle de Paris. 8 pages. Pl. xxiii.

The genus is described as follows:—"Corps oblong, composé de douze segmens; tête occupée entièrement par deux yeux à réseau, arrondie, non prolongée inférieurement en rostre. Quatre antennes; les supérieures plus courtes que la tête, courbées au bout; les inférieures beaucoup plus longues. Quatorze pieds; les quatres premiers courts, dirigés en avant, couchés sur la bouche, et représentant les deux dernières paires de pieds-mâchoires des Crustacés superieurs; les quatre suivans beaucoup plus grands, terminés par un crochet dirigés vers la queue; la cinquième paire très-longue dirigée vers la bouche, ayant l'avant-dernier article grêle, fort long, garni d'épines en dedans et terminé par un crochet; les quatre derniers, de moitie plus courts, dirigés et conformes de même, mais sans dents à l'avant-dernier article. Queue terminée par six appendices natatoires longs, aplatis, bifides à l'extrémité; trois paires de filets également natatoires sous les trois premiers segmens de la queue."

It belongs, Guérin says, evidently to Latreille's family of Uroptera. The type species is *Themisto gaudichaudii*, found "sur les côtes des îles Malouines par M. Gaudichaud," that is, at the Falkland Islands. It is well figured and described in much detail. By some misapprehension the mandibular palp is represented as 4- instead of 3-articulate.

1828. Milne-Edwards, Henri, born October 23, 1800, died July 29, 1885 (Friedländer, Naturæ Novitates).

Mémoire sur quelques Crustacés nouveaux. Annales des sciences naturelles. Tom. 13, pp. 287 to 301. Pl. 13, 14, 15. 1828.

The first of these new Crustaceans is considered by Milne-Edwards to be evidently an Amphipod. He says it resembles the Gammarids by its general form, the disposition of the antennæ, and the appendages under the five first segments of the abdomen; it is separated from them by the structure of the two first pairs of feet, by the form of the terminal segment of the abdomen, and by the long filaments which this latter supports; these characters, he says, bring it near to *Eupheus*, with which it cannot be confounded. *Eupheus* had been withdrawn from the Isopods and placed among the Amphipods by Latreille in his last work, and Milne-Edwards believes that his new genus will here fill up a gap between "les Amphipodes uroptères et les hétérops," though the characters of the Uroptera will require some slight modification. He thus defines the genus *Rhœa*:—"Quatre antennes dont les supérieures sont grosses, bifides, et plus longues que les inferieures, quatorze pattes dont les deux premières terminées par une pince et les autres par un ongle crochu; le dernier article de l'abdomen allongé et supportant deux appendices terminés par de longs filamens." The type species *Rhœa latreillii* has now been transferred to the earlier genus *Apseudes*, Leach, of which Risso's *Eupheus* is considered a synonym. Whether this and the other Tanaidæ should be reckoned as Amphipods is a matter still sub judice.

1828. Straus-Durckheim, Hercule Eugène, born 1790 (Hagen).

Considérations générales sur l'Anatomie comparée des Animaux articulés, aux quelles on a joint l'anatomie descriptive du melolontha vulgaris (hanneton), donnée comme exemple de l'organisation des coléoptères. Paris, Strasbourg, Bruxelles, 1828.

In the introduction the author observes that animals had generally been classified in a simple series, but that the natural method is ramified, as Lamarck had first pointed out in his "*Hist. nat. des animaux sans vertèbres*, 1815; tome 1er, p. 457."

In the "Tableau synoptique des animaux articulés, avec l'indication des genres par lesquels les classes et les ordres s'avoisinent dans l'état actuel de la science," he passes from the first class, Annelids, to the Myriapods as the second class, and from these in a straight line to the third class, the Insects, but through a branching off at the genus *Glomeris* to the fourth class Crustacea, in which the 1er Ordre, Isopodes" descends through the "P.er G.re *Armadillo*" to *Sphæroma* and *Proto*. At *Proto* branches off the "2.e Ordre, Parasites," including the genera *Nymphon* and *Lernæa*, while at *Sphæroma* another branch carries down the lines as follows:—3.e Ordre Amphipodes. P.er Gre *Hiella*. D.er G.re *Phronima*. 4e Ordre Stomapodes. P.er G.re *Squilla*. D.er G.re *Erichthus*. 5e Ordre Decapodes. 1re Fam. Macroures. P.er G.re *Mysis*." &c.

He discusses, pages 33 to 38, the chemical composition of the integument of insects and Crustacea, and mentions that what Odier calls *chitine*, Lassaigne proposed to call *Entomeiline*, from ἔντομον, an insect, and εἴλυμα, a covering.

In regard to his order of "Parasites," he says in the introduction, page 17, that in it he places successively "les *Nymphon*, les *Phoxichilus*, les *Pycnogonum*, les *Cyamus*, les *Cecrops*, les *Caligus*, les *Dichelestion*, les *Chondracanthe*, et les *Lernæa*," thus mixing up *Cyamus* with animals very differently constructed. For *Limulus* he proposes a separate order with the name Gnathopodes.

1828. Zenker, Jonathan Carl.

Das thierische Leben und seine Formen. Ein zoologisches Handbuch zum Gebrauche academischer Vorträge und zum Selbststudium. Jena, 1828.

Zenker here divides animals into ten classes, of which the Insecta are the fifth between the Vermes and Pisces. The Insecta are divided into two orders, Crustacea, and Insecta vera. The Crustacea include four subdivisions, Branchiopoda, Isopoda, Decapoda, and Octopoda. To the Isopoda he assigns four families, numbered in his system, 55. Pycnogona, 56. Leptomera, 57. Juli, 58. Aselli; and to the Decapoda four, namely, 59. Squillæ, Squillares, Goldf., 60. Paguri, 61. Astaci, 62. Cancri.

At page 342, he assigns to "56. Fam. *Leptomeræ*," the genera "1. *Leptomera* Latr. 2. *Proto* Leach. 3. Caprella Lam. 4. Cyamus Latr." He mentions that Goldfuss calls this family *Cystibranchia*, that *Leptomera rubra* Lam. is *Squilla rentricosa*, that the *Caprellæ*, as *Caprella linearis* Risso, live parasitically on Whales and fish in the European waters, and that "*Cyamus Ceti*," the *Walfischlassel* has two great compound eyes on the front side-rim of the head and two small simple (glatte) ones on the head. He says it is also called *Walfischaus* from its imbedding itself in the fat of the whale.

At page 349 he thus describes "59. Fam. *Squillæ*, *Squillares*, Goldf., Heuschreckenkrebse. Kopf dick (1), klein (7). Augen gestielt (4. 6. 7) oder sitzend (1, 2, 3, 5). Fühler 4, untere länger, mit gegliederter Endborste (2) oder ohne dieselbe (3), obere länger (5). Bruststück mit den Leibesringen von gleicher Grösse (1–5) oder viereckig grösser (6, 7). Füsse, fünftes Paar sehr lang mit einer Scheere (1), das zweite Paar (2) oder das vorderste (3), oder auch die zwei vorderen (5) mit solcher, oder ohne Scheere (4). Das zweite Paar der grösseren Kiefernfüsse mit einem glatten (6) oder gezähnelten (7) Endgliede, welches sich in eine Rinne des nachfolgenden Gliedes ein legt. Schwanz mit mehreren stielformigen (1), walzigen, gegliederten (2, 3, 5) Anhängseln oder 2 Schwanzblättchen (4), und 2 oder 5 (6) oder bloss 5 Kiemenfusspaaren auf dem Schwanze. 1. *Phronima* Latr. 2. *Talitrus* Latr. 3. *Corophium* Latr. 4. *Phasmatocarcinus* Tiles. 5. *Gammarus* Latr. 6. *Erichthus* Latr. 7. *Squilla* Faber." It will be noticed that the numbers in brackets refer to the numbered genera, and the stalked eyes of (4, 6, 7) will sufficiently point out that the genera so numbered do not belong to the Amphipod-group as now accepted. In the appended observations Zenker takes note of *Phronima sedentaria*, *Phronima custos*, *Corophium longicorne*, which, he says, is "*Cancer crassipes* L.," and of *Gammarus pulex*. He then adds, "Tilesius fand unter den leuchtenden Meerthieren auch mehrere hierher gehörige, wie die *Federkrebse*, *Phasmatocarcinus dicrophthalmus* und *glaucus*. Andere microskopische Thiergeschlechter, wie *Amblyrhyncotus*, *Erythrocephalus*, *Acanthocephalus*, u.s.w. verdienen vielleicht hier gleichfalls ihre Stelle. In reality it is only the genus *Erythrocephalus*, in this list from Tilesius, that can be reckoned among the Amphipoda.

1829. Audouin, V., et Milne-Edwards, H.

Résumé d'Entomologie, ou d'Histoire Naturelle des animaux articulés, par MM. V. Audouin et H. Milne Edwards. Tome Premier. Histoire Naturelle des Annélides, Crustacés et Arachnides. Contenant une esquisse de l'Organisation, des Caractères, des Mœurs et de la description de ces animaux; précédée d'une Introduction Historique, et suivie d'une Biographie, d'une Bibliographie et d'un

Vocabulaire ; par M. V. Audouin. Complétée par une Iconographie de 48 Planches. Paris, 1829. (In the Encyclopédie portative, sous la direction de M. C. Bailly de Merlieux.)

The Crustacea occupy pages 95–195. The account of "Ordre III.,—Edriophthalmes," pp. 173–184, is extracted from the work which Milne-Edwards had recently presented to the Académie des Sciences. Planche xxvii. gives figs. 1. 2. "Orchestie de Montagu;" fig. 3. "Leucothoe *furina*;" Planche xxviii. gives fig. 1. "Atyle caréné;" figs. 2. 3. "Corophie longicorne;" figs. 4. 5. 6. 7. "Cérapode tubulaire;" fig. 8. "Leptomère pédiaire."

1829. Bouchard-Chantereaux.

Précis de l'histoire physique, civile et politique, de la ville de Boulogne-sur-mer et de ses environs, depuis les Morins jusqu'en 1814 ; &c., par P.-J.-B. Bertrand. A Boulogne, 1828–1829.

In the second volume (1829), at page 488, is given a catalogue headed "Animaux sans vertèbres Observés par M. Bouchard-Chantereaux. (*Système du chevalier Lamarck*)." In this catalogue among the Crustacés are found the following Amphipods :—"Talitrus locusta, Talitre locuste. Orchestia littorea. Orchestie littorale. Cyamus ceti. Cyame de la baleine." No descriptions are given, or remarks of any kind.

1829. Johnston, George.

Contributions to the British Fauna. The Zoological Journal. Vol. IV. London, 1829. pp. 52–57, 416–421.

He says "In a preceding communication I had occasion to mention that the *Gammarus marinus* of Leach was common in this neighbourhood [Berwick] ; but from a subsequent examination of my specimens I am now convinced that I was in error, and that they constitute a distinct and uncharacterized species, which I proceed to describe.

"Gammarus carinatus. G. corpore maculato, atomisque flavis irrorato ; dorsi segmentis valde carinatis, marginibusque posterioribus granulatis. *Hab.* Mare Britannicum." The English description follows. This species is noticed by White, Pop. Hist. Brit. Crust., p. 183, but not by Spence Bate or Boeck. The name is preoccupied by Fabricius.

At page 417 he describes "Gammarus spinipes. Gamm. corpore albo, lævi, lineis rubris transversis picto ; palmâ pedis secundi dilatatâ, apice triangulari, monodactylâ, spinâ validâ infernè terminatâ. *Hab.* Littora maris Britannici." A description in English is given, and a speculation as to whether it could possibly be the same as *Jassa pulchella* of Dr. Leach. White, *loc. cit.*, p. 199, takes note of it under *Jassa*. Other authors leave it in its pristine obscurity.

1829. Latreille, P. A.

Le Règne Animal distribué d'après son organisation, pour servir de base à l'histoire naturelle des animaux et d'introduction à l'anatomie comparée. Par M. le baron Cuvier. Nouvelle édition, revue et augmentée. Tome IV. Crustacés, Arachnides et partie des Insectes. Par M. Latreille. Paris, 1829.

Here Latreille divides the Crustacea into two sections, "les Malacostracés et les Entomostracés." The former of these comprises five orders, "les Décapodes, les Stomapodes, les Læmodi-

podes, les Amphipodes, et les Isopodes." In the body of the work he transposes the Amphipoda and Læmodipoda. In treating "des Malacostracés à yeux sessiles et immobiles," he says, page 111, "Ces animaux se partagent en trois ordres : ceux dont les mandibules sont munies d'un palpe paraissent se lier naturellement avec les crustacés précédents, tels sont les amphipodes ; ceux où ces organes en sont dépourvus composeront les deux ordres suivants, les læmodipodes et les isopodes. Les cyames, genre du second, étant parasites, nous conduiront naturellement aux bopyres et aux cymothoés, par lesquels nous commençons les isopodes." That some Amphipoda are without, and that some Læmodipoda possess the mandibular-palp, had not yet been noticed.

Of les Amphipodes (*Amphipoda*), which he here makes the third order of Crustacea, he says, "ils pourraient être compris dans un seul genre, celui Des Crevettes. (Gammarus. Fab.), Que l'on peut partager d'abord, d'après la forme et le nombre des pieds, en trois sections.

"1° Ceux qui ont quatorze pieds, tous terminés par un crochet, ou en pointe et au nombre de quatorze.

"2° Ceux dont le nombre des pieds est encore de quatorze, mais où ces organes, ou les quatre derniers au moins, sont mutiques et simplement natatoires.

"3° Ceux qui n'ont que dix pieds apparents."

The first of these sections he divides into two, the *Uroptera* and the *Gammarinæ*. To the *Uroptera* he assigns *Phronima*, Latr., with the species *Phronime sédentaire*, Forsk., and *Phronime sentinelle*, Risso ; *Hyperia*, Latr., "dont le corps est plus épais en devant ; dont la tête est occupée, en majeure partie, par des yeux oblongs et un peu échancrés au bord interne ; dont deux des antennes sont aussi longues au moins que la moitié du corps, et terminées par une tige sétacée, longue et composée de plusieurs petits articles," with references to "*Cancer monoculoides*, Montag., Trans., linn. Soc., XI., ii. 3 ;—*Hypérie de Lesueur*, Latr., Encyclop. méthod. atl. d'hist. nat., cccxxviii, 17, 18 ; Desmar., Consid., pag. 258." The figures in the Atlas of the Encycl. méth. are there called *Phronima*, without any specific name. Here after *Hyperia* he places "Les Phrosines (Phrosine. Risso.) Semblables, pour la forme du corps et celle de la tête, aux hypéries, mais dont les antennes sont au plus de la longueur de cette partie, de peu d'articles en forme de stylet, ou terminées par une tige en cône alongée." To this genus he refers, "*Phrosina macropthalma*, Risso, Journ. de phys., octob. 1822 ; Desmar., *ibid.*, p. 259 ; *Cancer galba*, Montag., Trans. linn. Soc. XI., ii, 2." Next he places "Les Dactylocères. (Dactylocera. Latr.). Dont le corps n'est point épaissi en devant ; dont la tête est de grosseur moyenne, déprimée, presque carrée, avec les yeux petits ; et dont les quatres antennes, fort courtes et de peu d'articles, ainsi que dans les phrosines, sont de formes diverses : les inférieures étant menues, en forme de stylet, et les supérieures étant terminées par une petite lame concave au côté interne, et représentent une cuiller ou une pince." In a note to this description of *Dactylocera*, he gives references as follows ; "*Phrosina semilunata*, Risso, *ibid.*; Desmar., *ibid.* La tige des antennes inférieures présente deux ou trois articles, au lieu que, dans les phrosines, elle est inarticulée. Ici encore les articles des pédoncules des mêmes antennes sont plus courts." In the corrections and additions at the end of the volume he says, "près des Hypéries, doit être placé un autre genre de crustacés, celui de Thémisto, établi par le même naturaliste, et décrit ainsi que figuré, avec le même soin, dans le Tome IVe des Mémoires de la Société d'histoire naturelle de Paris." The naturalist thus indefinitely alluded to is Guérin. Latreille adds some remarks on the mouth-organs of *Themisto*.

Under the "Crevettines, *Gammarinæ*. Lat.," he places "un sous-genre, que nous avons établi sous la dénomination D'Ione (Ione.), mais uniquement d'après une figure de Montagu (*Oniscus thoracicus*, Trans., linn. Soc., IX, iii, 3, 4)," which, he says, has very special characters, separating it from all the rest of the same order. It is now recognised as an Isopod. After *Ione*, he gives *Orchestia*, *Talitrus*, *Atylus*, *Gammarus*, *Melita*, *Mæra*,

Ampithoe, *Pherusa*, *Dexamine*, *Leucothoe*, *Cerapus*, *Podocerus*, *Jassa*, *Corophium*, with references to one species of each genus. Under *Atylus*, besides *Atylus carinatus*, he suggests as possibly a second species, "*G. nugax?* ejusd.; Phipps, Voy. au Pol. bor., xii, 2?" Under *Ampithoe*, besides *Cancer rubricatus*, Montagu, he gives, as a second species,—"*Oniscus cancellus*, Pall., Spicil. zool., fasc. IX, iii, 18; *Gammarus cancellus*, Fab." Les Podocères, "à yeux saillants," are distinguished from les Jasses, "à yeux non saillants." The species mentioned are *Podocerus variegatus*, Leach, and *Jassa pulchella*, Leach.

The second section he calls "Heteropes, *Heteropa*, Lat." In a note he says, "Cette section et la suivante forment, dans la première édition de cet ouvrage, la seconde des isopodes, celle des *plytibranches*. Mais outre que nous avons aperçu, dans quelques-uns de ces crustacés, des palpes mandibulaires, la forme des appendices sous-caudaux nous a paru les rapprocher beaucoup plus des amphipodes que des isopodes. Au surplus, ainsi que nous l'observons plus bas, ces animaux, dont nous n'avons vu qu'un petit nombre, n'ont pas encore été bien étudiés." To the *Heteropa* he assigns *Pterygocera*, Lat., and *Apseudes*, Leach. A note to the generic description of *Pterygocera*, says, "d'après la figure de Slabber (*Oniscus arenarius*, Encyclop. méthod., atl. d'hist. natur., cccxxx, 3, 4.), le nombre des pieds ne serait que de huit; mais je présume, par analogie, qu' il est de quatorze; au surplus, si la figure est exacte, ce genre appartiendrait à la section suivante." In Slabber's figure, the animal being viewed from above, many of the limbs are naturally concealed from the observer.

The note to Les Apseudes gives "*Euphleus ligioides*, Risso, Crust., III, 37; Desmar., Consid., 285;—*Apseudes talpa*, Leach; *Cancer gammarus talpa*, Montag., Trans. linn. Soc., IX, iv, 6.; Desmar., Consid., xlvi, 9. *Voy.* aussi le *gammarus heteroclitus* de Viviani, Phosphor. maris, II, 11, 12."

The third section, "Decempèdes, *Decempedes*. Latr.," includes Typhis, Risso; Anceus. Risso.—Gnathia. Leach.;" Praniza, Leach. The remark follows that, "À ce même ordre des amphipodes paraissent appartenir divers autres genres de MM. Savigny, Rafinesque et Say, mais dont les caractères n'ont pas été donnés ou suffisamment développés." A note adds, "Je ne puis encore rien dire du *G. ergine* de M. Risso: il semble, par le nombre des pieds, appartenir à la dernière section des amphypodes, et par la manière dont ils se terminent et le nombre des segments du corps, se ranger avec les isopodes."

Of Les Lemodipodes. (Læmodipoda.), which he here makes the fourth order of Crustacea, he says, "Dans la première édition de cet ouvrage, ils formaient la première section de l'ordre des isopodes, celle des cistibranches. On pourrait n'en former qu'un seul genre, auquel, par droit d'ancienneté, on conserverait le nom "De Cyame. (Cyamus, Latr.)." He does not, however, carry out this suggestion, but retains the old grouping into *filiformia* and *oralia*. To the former he assigns three genera, as follows:—"Les Leptomères. (Leptomera, Latr.,—*Proto*, Leach.)

"Ont quatorze pieds (les deux annexés à la tête compris) complets et dans une série continue.

"Ici, comme dans nos Leptomères propres (*Gammarus pedatus*, Mull., Zool. dan., CI. 1, 2), tous les pieds, à l'exception des deux antérieurs, ont un corps vésiculaire à leur base. Là, comme dans les Protoxs de M. Leach (*Cancer pedatus*, Montag., Trans. linn. Soc., II, 6; Encyclop. méth., atl. d'hist. natur., cccxxxvi, 38.), ces appendices ne sont propres qu'aux seconds pieds et aux quatre suivants (1). [with a note] (1) Rapportez encore aux leptomères la *squilla ventricosa* de Müller, Zool. dan., LVI, 1–3; Herbst., xxxvi, 11:—le *Cancer linearis* de Linnæus est peut-être congénère. Il lui donne six pieds, mais sans compter la tête.

"Les Nauprédies. (*Naupredia*, Latr.).

"N'ont que dix pieds, tous dans une série continue; les seconds et les deux paires suivantes ont à leur base un corps vésiculaire (1). [with note] (1) Sous-genre établi sur une espèce de nos côtes qui me paraît inédite.

"Les Chevrolles. (Caprella. Lamck.)." Of these the generic description is given, and in the note references appear to various species which are, not wholly without reason, criticised as doubtful.

Of the *oralis* Latreille says, "Ces hémodipodes forment le sous-genre Des Cyames proprement dits. (Cyamus, Latr.,—*Larunda*, Leach.)

"J'en ai vu trois espèces, qui vivent toutes sur des cétacés, et dont la plus connue, le *Cyame de la baleine* (*Oniscus ceti*, Lin.; Pall., Spicil. zool., fasc. IX, iv, 14; *Squille de la baleine*, Degéer., Ins., VII, 6, vi; *Pycnogonum ceti*, Fab.; Savig., Mém. sur les anim. sans vert., fasc. I, v, 1.) se trouve aussi sur le maquereau; les pêcheurs l'ont designée sous le nom de *Pou de baleine*. Une autre espèce, très analogue, a été rapportée par feu Delalande de son voyage au cap de Bonne Espérance. La troisième, beaucoup plus petite, se trouve sur des cétacés des mers des Indes orientales."

1829. Müller, Johannes, born 1801, died 1858 (Hagen).

Sur la Structure des Yeux du Hanneton (Melolontha vulgaris). Annales des Sciences naturelles. Tome dix-huitième. Paris, 1829. p. 107.

In this letter to the editors Müller criticises Straus-Durckheim's views on the eyes of insects, and Straus-Durckheim replies to him at p. 463 of the same volume. Müller refers to Straus-Durckheim's description of the eye of Daphnia, and adds "c'est la même structure que j'ai observée moi-même dans les *Monoculus apus*, *Gammarus pulex* et *Cyamus ceti*," and in a note to this passage he says, "Voyez mon second Mémoire sur la structure des yeux chez les insectes et les crustacés.—Meckel's, *Archiv für Anatomie und Physiologie*. 1829. H. i."

1829 ? Straus-Durckheim, H. E.

Mémoire sur les Hiella, nouveau genre de Crustacés Amphipodes. Mémoires du Muséum d'Histoire Naturelle. Tom. xviii. pp. 51–62. Pl. 4. Paris, 1829 ?

This author considers that the Amphipods are distinguished from the Isopods, because "in the Amphipods the mandibles are palpiferous; the front pairs of feet are directed forwards, and the hinder backwards; the abdomen, generally flexed underneath, carries several pairs of bifid false feet, like those of the Decapoda macroura, and the last which corresponds to the lateral appendages of the hinder segment in many Isopods, generally preserves the form of the other false feet, and is not enlarged into swimmerets. The most obvious characters to distinguish the two orders are the presence or absence of the mandibular palp, that presented by the branchiæ, and that offered by the form and arrangement of the abdomen," *Hiella* he regards as a link between the two orders. He recognises its affinities with *Themisto*, *Phronima*, *Hyperia*, but is led away from perceiving its identity with the last by the inaccuracy of Latreille's definition. The genus *Hiella* is characterised as follows:—"Tête hémisphérique, quatre antennes courtes en alène de quatre articles; bouche saillante, composée d'un labre, d'une paire de mandibules, de deux paires de mâchoires et d'une lèvre inférieure terminée par deux lobules; le tronc et l'abdomen chacun de sept segmens mobiles; sept paires de pates ambulatoires, dont quatre dirigées en avant et trois en arrière; une paire de fausses pates à chaque segment abdominal." The type species, "*Hiella Orbignii*," from near Rochelle, does not appear to be mentioned in the Brit. Mus. Catalogue. Milne-Edwards, 1840, regards it as a synonym of his *Hyperia latreillii*, and both are by Boeck

made synonyms of *Hyperia medusarum*, Müller. Straus-Durckheim gives elaborate descriptions and figures of the structure, nervous system, etc. For the six joints of the leg he uses the terms hanche, trochanter, cuisse, jambe, tarse and crochet.

1830. Bosc, L. A. G.

Manuel de l'histoire naturelle des crustacés, etc., Par L. A. G. Bosc. Édition *Mise au niveau des connaissances actuelles*, par M. A. G. Desmarest. Paris, 1830.

The Amphipoda are in the second volume of this little work, which, when completely out of date, was refurbished in a confused manner, probably to suit some publisher's purpose rather than the cause of science. The Amphipoda are included in the numbered genera, XLVI. *Corophium*, Latr. XLVII. *Talitrus*, Latr. XLVIII. *Gammarus*, Fabr. XLIX. *Phronima*, Latr. L. *Cyamus*, Latr. LI. *Caprella*, Lam. LII. *Leptomera*, Latr. LVII. *Typhis*, Latreille. At p. 106 Leach's genera "*Pherusa*, *Mœra*, *Melita*, *Leucothoe*, *Dexamine*, *Atylus*, *Amphithoe*, etc.," are mentioned as "genres que nous n'adopterons pas." Sixteen species are assigned to *Gammarus*, which include *longicornis*, *gibbosus*, "Esca," "Pherusa," "Medusarum" and "Homari." *Corophium longicorne* had been given in advance. *Cyamus ceti* "se trouve dans la mer du Nord, non seulement sur les baleines, mais encore sur les maquereaux et autres scombres."

1830. Eschscholtz, Johann Friedrich, born Nov. 12, 1793, died May 12, 1831 (*Encycl. Brit.*, 9th Edition).

A new voyage round the world, in the years 1823, 24, 25, and 26. By Otto von Kotzebue. London, 1830. Appendix. Review of the Zoological collection of Fr. Eschscholtz.

At p. 326, Eschscholtz says that while detained in the Baltic they were enabled to use their deep fishing-nets upon the great banks. These brought to light a considerable number of marine animals. Upon the branches of the *Spongia dichotoma* sat swarms of Star-fishes and Crustacea, the latter including *Caprella scolopendroides*, Lam.

1830. Milne-Edwards, Henri.

Extrait de recherches pour servir à l'histoire naturelle des Crustacés Amphipodes. (Extrait des *Annales des Sciences naturelles*, août 1830). Tom. 20. Pl. 10. 11. 48 pages.

The Crustacea are here divided into eleven orders, of which the seventh, eighth and ninth are the Læmipodes, Isopodes and Amphipodes. Milne-Edwards feels bound to observe that at first he had placed the genera *Rhoea* and *Tanais* among the Amphipods, but by Latreille's advice had transferred them to the Isopods, being thus enabled to assign more definite characters to these orders, without making them less natural. Some authors think that he was in this respect ill-advised, and that he would have done better to follow his own judgment.

The Amphipods he divides into two families, the *Crevettines* and the *Hypérines*. When he says that the Crevettines are never parasitic, he is naturally passing no judgment on the habits of *Guerinia* and *Lafystius* or other later discoveries, and the relation of *Isæa montagui* to *Maia squinado* seems to be only residential, not parasitic.

The *Crevettines* he subdivides into the tribe of the *Sauteurs* and the tribe of the *Marcheurs*. In the former he includes the following genera, the first two as *arénicoles*, the remainder as *aquatiques* :—

1. *Orchestia*, Leach, to which he transfers *Talitrus longicornis*, Say. He here describes *Orchestia Fischerii*, Milne-Edwards, with a reference to "Mém. de la Soc. d'Hist. nat. de Paris. t. 5. pl. 25, fig. 14." This species Spence Bate refers to *Orchestoidea*.
2. *Talitrus*, Latr., including *Talitrus Beaucoudraii*, n. s., which Spence Bate thinks is probably the female of *Orchestia littorea*, with Klein's *Saltator* and Audouin's *O. Cloquetii*.
3. *Lysianassa*, n. g., thus described :—"Les Crevettines, que nous plaçons dans cette nouvelle division générique, se rapprochent des Talitres par la structure de leurs pattes, dont aucune n'est préhensile ; celles de la première paire sont assez fortes, presque cylindriques dans toute leur longueur et terminées par un article court et presque immobile. La forme des divers appendices de la bouche est au contraire la même que dans les Crevettes et les autres genres de la subdivision des Aquatiques ; les antennes sont quelquefois très-courtes, mais les supérieures sont toujours au moins aussi longues que le pédoncule des inférieures et se terminent par deux tigelles annelées." He describes and figures "*Lysianassa Costæ*," n. s., pl. 10, fig. 17, and gives brief notes upon "*L. Chauseica*," n. s., which he afterwards transferred to a new genus *Alibrotus*.
4. *Gammarus*, Fabr. in which he describes and figures *Gammarus ornatus*, n. s., pl. 10, figs. 1–8, in his account of this species calling attention to what he then thought a unique phenomenon, the *calceoli*, as they were afterwards called, on the flagella of the lower antennæ, "une petite cupule membraneuse, transparente, invisible à l'œil nu, légèrement ciliée sur les bords, fixée à l'antenne par sa base et entourée de quelques poils (pl. 10. fig. 2, b) ;" he describes "*Gammarus Olivii*," n. s., pl. 10, figs. 9, 10, which by both Sp. Bate and Boeck is referred to *Gammarus marinus*, Leach; he describes and figures "*Gammarus Othonis*," pl. 10, figs. 11–13 which by Bate is referred to *Megamœra*, by Boeck to *Mœra, longimanus*, Leach ; he gives brief distinguishing marks for *Gammarus atlanticus*, n. s., which he afterwards described as *Lysianassa atlantica;* "*Gammarus Impostii*," n. s. = *Mœra grossimanus*, Montagu (according to Spence Bate in the British Museum Catalogue of Amphipodous Crustacea) ; "*Gammarus Dugesii*," n. s. = *Melita palmata*, Montagu ; *Gammarus podager*, n. s. = *Melita podager* (B. M. C.) ; "*Gammarus Savii*," n. s. = *Mœra Savii* (B. M. C.), but a doubtful species ; *Gammarus brevicaudus*, n. s., afterwards corrected into *Gammarus brevicaudatus* = *Gammarella brevicaudata* (B. M. C.). As "Espèces douteuses" he gives 1. *Oniscus arenarius*, O. Fabr., referring to it *Gammarus Homari*, Fabr., and Strom's *Marylue ;* 2. *Oniscus abyssinus*, O. Fabr. ; 3. *Gammarus marinus*, Risso, and *Gammarus palmatus?* Montagu.
5. *Amphithoe*, Leach, in which he describes and figures *Amphithoe costata*, n. s., pl. 10, figs. 14–16, a species transferred by Spence Bate to the genus *Pherusa* of Leach, with a note of Milne-Edwards' error in attributing four joints to the mandibular-palp in the text, though he correctly figures only three ; he gives very concisely distinguishing marks for "*Amphithoe Marionis*," n. s. = *Deramine spinosa*, Montagu (B. M. C.) ; "*Amphithoe Jurinei*," n. s. = *Pherusa fucicola*, Leach (B. M. C.) ; "*Amphithoe Pausilipæ*," n. s., which he afterwards called *Amphithoe Pausilipii" ;* "*Amphithoe Indu*," n. s., afterwards called "*Amphithoe Indica*," and said to be very near the preceding species ; "*Amphithoe Reynaudii*," n. s.; *Amphithoe armorica*, n. s., which "appears to belong to the genus Nicea," according to the B. M. C., p. 243, note ; "*Amphithoe Swammerdamei*," n. s., afterwards called *Amphitoe Swammerdamii* = *Atylus Swammerdamii* (B. M. C.) ; *Amphithoe pelagica*, n. s. ; "*Amphithoe Prevostii*," n. s., on which see below.
6. *Isæa*, n. g., thus described :—"Dans le genre Isæa, la forme générale du corps est la même que chez les Crevettes ; les antennes supérieures se terminent aussi par deux appendices annelés ;

mais, au lieu de n'avoir que les pattes des deux premières paires préhensiles, ces Crustacés les ont toutes terminées par une griffe mobile qui se reploie sur le bord de l'article précédent." The type species "*Isæa Montagui*" is given without further description.

7. *Leucothoe*, Leach.

In the tribe of the *Marcheurs* are included 1. *Erichthonius*, n. g., thus described :—"Les Crevettines appartenant à ce genre nouveau ont beaucoup d'analogie avec les Leucothoés, dont elles diffèrent principalement par l'état rudimentaire des pièces épimériennes des premiers segmens thoraciques. Les antennes supérieures sont simples et à peu près de la longueur des inférieures ; les pattes de la seconde paire sont terminées par une main très-grosse formée par l'antépénultième article, et présentent en avant un prolongement sur lequel s'appuie la griffe qui est composée elle-même des deux derniers articles." This genus has been by some authors made the synonym of *Cerapus*, Say, but is now again separated from it. Of his type species, *Erichthonius difformis*, Milne-Edwards says only "point de prolongement spiriforme [spiniforme] sur l'antépénultième article des pattes antérieures." 2. *Atylus*, Leach, probably placed in this inappropriate position through insufficient knowledge ; 3. *Unciola*, Say ; 4. *Cerapus*, Say ; 5. *Podocerus*, Leach ; 6. "*Corophia*, Latr.," in which to "*C. longicorne* Latr." is added a new species "*C. Bonellii*," only distinguished by the words "troisième article des antennes inférieures dépourvu de dents à son bord inférieur," to which in the Hist. nat. des Crustacés is added the further mark of "deux grandes épines au bord inférieur de l'article basilaire des antennes supérieures." Boeck makes the species a doubtful synonym of *Corophium crassicorne*, Bruzelius ; G. O. Sars says it is easily distinguished from that species by the rounded side-lobes of the head and the far weaker structure of the lower antennæ in both sexes (Oversigt, p. 112, 1882).

The family of the Hypérines is divided into eleven genera :—1. *Vibilia*, n. g. thus defined :—"Corps grêle et allongé comme chez les Crevettines de la seconde tribu ; tête petite et tronquée en avant ; antennes supérieures grosses, courtes, non subulées et arrondies au bout ; celles de la seconde paire, courtes et styliformes ; thorax divisé en sept segmens ; pattes de la deuxième paire terminées par une petite main imparfaitement didactyle, dont le doigt mobile est formé par les deux derniers articles ; pattes de la septième paire très-courtes, mais de même forme que les précédentes." The type species "*Vibilia Peronii*" is not further described. Latreille, in his Report upon this paper, supposes *Vibilia* to be a synonym of his own *Dactylocera*, but that genus, as Milne-Edwards points out in a note, corresponds only with Risso's *Phrosine semilunata*.

2. *Hyperia*, Lat., which Milne-Edwards thinks identical with *Lanceola*, Say. Sp. Bate makes *Lanceola* = *Vibilia*, but he also drops the name on account of the obscurity of Say's description, and Bovallius, 1886, vindicates the distinctness of *Lanceola* from both *Hyperia* and *Vibilia*. To *Hyperia* are here assigned "*Hyperia Latreillii*," n. s., pl. 11, figs. 1–7, *Talitrus cyaneæ*, Sabine, both synonyms of *Hyperia medusarum*, O. F. M., *Lanceola pelagica*, Say, which is out of place, and *Hyperia cornigera*, n. s., later placed by Milne-Edwards in his new genus *Tyro*.

3. *Phoreus*, n. g., thus described :—"Dans cette petite division générique de la famille des Hypérines, les antennes inférieures sont tout-à-fait rudimentaires ; la tête est très-grosse ; le second segment du thorax est notablement plus développé qu'aucun des autres ; aucune des pattes n'est préhensile, ni terminée par une main ; celles des quatre premières paires sont courtes ; les cinquièmes sont très-longues, mais filiformes, et ne peuvent guère servir à la locomotion ; celles de la sixième paire, encore plus longues, sont, au contraire, très-fortes ; enfin celles de la dernière paire sont rudimentaires ; la structure de l'abdomen est la même que dans le genre Hypérie." The type species is *Phoreus Reynaudii*, n. s.

4. *Lestrigonus*, n. g., thus described :—"Tête très-grosse et renflée ; premier segment du thorax rudimentaire ; abdomen plus grand que le thorax ; antennes à peu près de même longueur,

terminées toutes par une longue tige subulée, multi-articulée. Aucune patte n'est préhensile mais celles de la seconde paire présentent une espèce de petite main formée par l'anté-pénultième article, etc., etc." The type species is *Lestrigonus Fabrei*, n. s., described and figured afterwards in the Hist. nat. des Crustacés. By many authors the genus *Lestrigonus* is considered to represent only the male forms of *Hyperia*, Latr.

5. *Daira*, n. g., thus described :—"Tête grosse et renflée ; antennes styliformes et rudimentaires ; thorax conique, très-étroit postérieurement et ayant le premier segment très-court ; pattes des deux premières paires portant une main imparfaitement didactyle, dont le doigt mobile est formé par les deux derniers articles ; abdomen comme dans le genre Hypérie." Type species "*Daira Gaberti*," n. s., described subsequently in the Hist. nat. des Crustacés. The name *Daira* being pre-occupied is changed by Dana into *Dairilia*, which owing to a misprint in his work is sometimes written *Dairinia*, but Bovallius, 1886, maintains that Dana's *Dairilia* is a distinct genus, and that *Paraphronima*, Claus, is the genus which comes nearest to Milne-Edwards' *Daira*, or is possibly identical with it.
6. *Themisto*, Guérin.
7. *Dactylocera*, Latr., which Latreille, as already mentioned, supposed to be the same as *Vibilia*, Milne-Edwards, but which Milne-Edwards, probably against his better judgment and merely out of respect to Latreille, introduces here with the synonym "*Phrosina?* Risso." He assigns to it only the species "*Dactylocera Nicæensis*," n. s., with the synonym "*Phrosina semilunata?* Risso." In 1840 he called the species "Phrosina Nicetensis," and distinguished it, though perhaps needlessly, from *Phrosina semilunata*, Risso, on the authority of Costa's figures of the latter species in the Fauna del regno di Napoli, pl. 4, figs. 1–5.
8. *Anchylomera*, n. g., thus described :—"Forme générale du corps la même que dans le genre précédent ; antennes très-courtes et styliformes ou nulles ; thorax divisé en six segmens ; pattes des deux premières paires terminées par un article aplati et lancéolé ; celles de la troisième et de la quatrième paires terminées par une petite main formée par le troisième article ; pattes de la cinquiéme paire grosses et subchelifères ; enfin celles des deux dernières paires terminées par une tige grêle et cylindrique." Two new species, *Anchylomera Blossevillii* and *Anchylomera Hunterii*, are assigned to this genus.
9. *Phronima*, Latr.
10. *Typhis*, Risso, to which he assigns *Typhis ferus*, n. s., pl. 11, fig. 8–18, and *Typhis rapax*, n. s. Of *Typhis ferus* Claus says that it is clear Milne-Edwards only knew the male of a species probably belonging to the genus *Hemityphis*, Claus. *Typhis rapax*, Claus considers to belong to a different genus, perhaps that which he calls *Schizoscelus* in his family *Scelidæ*. As "espèces douteuses" Milne-Edwards places under this genus, *Typhis oroides*, Risso ; *Gammarus monoculoides?* Montagu ; *Cancer ampulla?* Phipps ; and *Gammarus gibbosus??* Fabricius.
11. *Oxycephalus*, n. g., thus described :—"Ces Amphipodes s'éloignent de la plupart des Hypérines par la forme grêle et allongée de leur corps, par leur tête aplatie et lancéolée, etc. Les antennes sont semblables à celles des Typhis ; les pattes des deux premières paires sont terminées par une main didactyle bien formée ; les autres sont grêles, cylindriques et non préhensiles ; celles de la septième paire sont très-courtes. La disposition de l'abdomen et de ses appendices est assez semblable à ce qui existe chez les Hypéries," with the type species *Oxycephalus piscatoris*, n. s., a name afterwards changed to *Oxycephalus piscator*.

Among genera *incertæ sedis* he mentions *Hiella*, Straus, as no doubt belonging to *Hyperia*, *Lepidactylis*, Say, as seeming to come among the *Hyperinæ*, *Pterygocera*, Latreille, *Spirchius* and *Leplurus*, Raffinesque, on which he ventures no opinion, *Apseudes*, as probably near to *Tanais*, in the Order of the Isopoda, Family Idoteidæ, and lastly *Ione*, *Anceus* and *Pranica* as certainly belonging not to the Amphipoda but to the Isopoda.

In the Hist. nat. des Crustacés, Milne-Edwards gives a description of his "*Amphitoe Prevostii*," differing very little from his account of *Amphitoe pontica*, as he calls the *Hyale pontica* of Rathke. Rathke in his Norwegian Fauna, p. 81, names a species, "*Amphithoë Prevostii*, M. Edwards?," which he thought had no telson, and was thereby distinguished from his own Crimean species *Hyale pontica*. But the want of a telson in such an Amphipod is obviously only an accidental defect. Rathke subsequently, p. 264*c*, without giving any reasons, makes his Norwegian specimen a separate species as "*Amphithoë Nilssonii*." This species Spence Bate in the British Museum Catalogue, p. 38, accepts under the name "*Allorchestes Nilssonii*," with references to Rathke, while *Amphitoë Prevostii*, Milne-Edwards, is made a synonym of *Nicea prevostii*, at p. 53. Milne-Edwards' species will stand as *Hyale prevostii* whether *Hyale nilssonii* be a synonym of it or not. *Hyale pontica* is a distinct species.

1831. LATREILLE, P. A.

Cours d'Entomologie, ou de l'histoire naturelle des crustacés, des arachnides, des myriapodes et des insectes. Ouvrage accompagné d'un atlas. A Paris, 1831.

The class of Crustacea is discussed from p. 311 to p. 469. The *Læmodipoda* are here the third order, without alteration within the order itself. The genus *Nempredia*, Latreille, evidently founded on an imperfect specimen of a *Proto*, is still retained.

The Amphipoda are here the fourth order. "Envisagés sous la considération des habitudes," he says, "les amphipodes peuvent être partagés en trois sections, les sauteurs, les marcheurs et les parasites. Les premiers composeront la famille des crevettines, les seconds celle des podocérides, et la dernière celle des hypérines de M. Milne-Edwards. Les deux premières, composées d' amphipodes errans ou vagabonds, se distinguent de celle-ci par les caractères suivans: pieds-mâchoires (ceux de la première paire, et présentant l'apparence d'une lèvre inférieure recouvrant les autres parties de la bouche) pluriarticulés, et réunis seulement à leur naissance; deux paires de lobes triangulaires, et dont les deux supérieurs plus grands, mais n'atteignant pas l'extremité de ces organes dans leur entredeux, et annexés à leur côté interne."

In the first family, CREVETTINES (GAMMARINÆ), while waiting for the new distribution by Milne-Edwards, Latreille forms two sections, one containing LEUCOTHOÉ (*leucothoe*) Leach; the other containing CREVETTE (*gammarus*); PHÉRUSE (*pherusa*), Leach, (including in this latter genus "plusieurs autres de ce naturaliste, tels que ceux d'*ampithoe*, de *mœra*, *melita* et *dexamine*"); TALITRE (*talitrus*), and ORCHESTIE (*orchestia*).

In the second family, PODOCÉRIDES (PODOCERIDES), he mentions *Corophium*, with M. d'Orbigny's account of its habits, *Podocerus*, *Jassa*, *Cerapus*, *Atylus*.

In his account of the third family, HYPÉRINES (HYPERINÆ), he alludes to the genera "*lestrigon* et *daira* de M. Edwards." He also says, "Le genre DACTYLOCÈRE (*dactylocera*, LATR.; *cibilia*, EDW.) se distingue de tous les suivans par plusieurs caractères. La tête est de grosseur ordinaire ou moyenne. Au-devant de la fausse lèvre inférieure, à l'origine de ses lobes latéraux, est de chaque côte un petit corps palpiforme; les antennes supérieures sont très courtes et terminées par un grand article lamelliforme. M. Edwards exposera les autres caractères de ce genre dans sa *Monographie des amphipodes:* j'y rapporterai la *phrosine en croissant* de MM. Risso et Desmarest." He then gives an account of *Typhis*, *Phronima*, *Themisto*, in regard to the latter explaining the origin of his term *decempèdes*. The first four feet being small and closely applied to the mouth, he regarded them rather as mouth-organs than as legs in *Themisto*, in his own genus *Hyperia*, and in that which in the new edition of Cuvier's *Règne animal*, he had called *Phrosine*, with *phrosine gros-œil* of

Risso for the type species. With this last he considers that Straus' *Hiella* is identical, and this he notes has been identified with *Hyperia* by Milne-Edwards. He commends Straus' exact description of *Hiella d'Orbignii*, except for the attribution of seven instead of six segments to the pleon.

1832. Cocco, Anastasio.

Su di alcuni nuovi crustacei de' mari di Messina Lettera del dott. Anastasio Cocco *al celebre dott.* William Elford Leach *uno de' conservatori del Museo britannico in Londra.* Effemeridi scientifiche e letterarie per la Sicilia. T. II. N. 6. *Giugno* 1832. pp. 205–209.

In the letter he makes mention of *Ischyrocheles Leachi*, *Chiropristis litorea*, *Charybdis zanclea*, and various other Crustacea. He gives a long description of a Decapod which he names *Acheles arachnipodus*, and then continues as follows :—

"Agli schiropodi crioftalmi, ed a que' soprattutto, che a cagione del loro capo sprovveduto di antenne direi gimnocefali, spetta un nuovo genere di crustacei, che vo appellare dal nome del primo fondatore di Messina *Orione*.

"Orio . . . *Capite fornicato. Pedibus maxillaribus exterioribus longissimis, capillaribus, replicatis, capite obtectis. Binis pedum anticorum paribus chelatis, brevissimis, reliquis simplicibus: binis posterioribus basi squamâ instructis. Caudâ stiliferâ.*

"O. Becco d'uccello. *O. Ornithorhamphus fig.* 2.

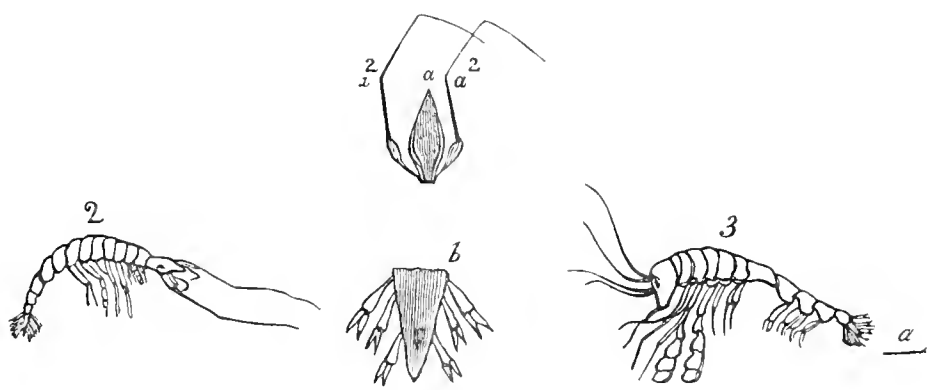


Fig. 22.

"Il corpo di questo crustaceo è cristallino, molle, lungo nove linee, largo una, composto di sette segmenti toracici uguali, e di cinque addominali più grandi, che impiccioliscono in verso la coda: quest' ultimi terminano co' loro margini postico-inferiori appuntati. Il capo è ovoides, reticolato, inferiormente tagliato in forma di becco di penna da scrivere, e questo agguaglia intorno il terzo della lunghezza del capo.—Gli occhi sono piccioli, rotondati, di color marrone. I piedi mascellari esteriori pressochè della lunghezza del corpo son composti di quattro lunghi articoli, de' quali il basilare è allargato all' apice. I piedi-mani sono cortissimi, gli altri quattro sono sottili, terminati da una piccola unghia acutissima, e le ultime due paja hanno alla base una squama ovale.—La coda ha la squama intermedia ovale-oblunga, e sostiene da ogni lato tre steli bifidi, decrescenti in grandezza dalla base all' apice di essa.

"Trovasi in sulle spiaggie di Messina balzato dalle onde in marzo, di unita alle fronime, alle frosine, al mio *Chiropristis*, ed alla mia *Charybdis Zanclea*. Ho voluto cambiare quest'

ultimo genere in quello *di Orio;* perciocchè mi sono accorto, avere il ch. Raphinesque appellato Cariddi uno dei crustacei macrogasteri podoftalmi.—Terrà ella adunque l'*Orio Zancleus* come sinomino della *Charybdis Zanclea*, il quale differisce assai dall' *Orio ornithoramphus* per aver quello il capo corto, ottuso, gli occhi grandi, semilunati, il corpo conico, ed il colorito cinereo punteggiato di fosco. Diverso è ancora l'ornitoramfo da un altro orione, che il mio discepolo Niccolò Prestandrea descriverà, appellandolo *O. Oxyrhingus;* conciosiacchè sia questo più piccolo, alquanto compresso, di color roseo, ed abbia il capo assai sottilmente allungato.

"Vado finalmente a descrivere un piccolo crustaceo alla stessa sezione pertinente, che per avere il capo fornito di antenne, potrebbe con molti altri costituire la divisione de' *Cheratocefali*, e piacemi appellarlo.

"Bivonia . . *Corpore lineari, molli, compresso. Pedibus decem, tertio pari validiore, manibus cheliformibus, altero digito mobili instructo. Capite verticali. Antennis quatuor capillaribus. Caudâ styliferâ.*

"B. Zanzara. *B. Culicina* Fig. 3.

"Il corpo di questo piccolo crustaceo è cristallino, molle, sparso di pochi e minuti punti ranci, lungo cinque linee, largo una. Ha il capo turgido superiormente a' lati, reticolato, proboscideo; la fronte piena; gli occhi sessili, rotondi, ranci, con due punti laterali dello stesso colore. Le antenne superiore poste tramezzo agli occhi sono capillari, lunghe tre linee sostenute da peduncoli grossi, lunghi una linea e mezza, composti di due articoli: il basilare piccolo, rotondato, e l'estremo cilindrico, tre volte più lungo. Le antenne inferiori parimenti capillari, quasi eguali alle superiori, compresi i peduncoli di queste, sono sostenute da corti peduncoli tri-articolati. Il corsaletto si compone di sei segmenti, l'anteriore de' quali strettissimo; l'addomine di cinque è più larghi. Il primo e secondo pajo de' piedi sono lunghi, assai sottili, e tinti in verso l'apice di rancio. Il terzo pajo è più forte, ed ha una mano più o meno rigonfiata col dito anteriore corto, semplice, immobile, ed il posteriore grande, incurvo, acuto, mobile. La mano inoltre è sparsa di minutissimi punti ranci, visibili col soccorso della lente, ed ha, come il carpo e l' avambraccio, il margine anteriore dentellato; il braccio poi, ch'è dilatato all' apice, ha nella parte anteriore di esso una piccola punta. Le due paja di piedi posteriori sono semplici con alla base una squama ovale-oblunga. La coda si termina con una piccola squama ottusa, punteggiata di rancio, e porta da ogni lato tre stili bifidi.

"Questo crustaceo, che come i precedenti viene in marzo balzato dalle onde in sulla spiaggia, a dirle il vero, mi fe'restare gran pezza in forse se dovessi farne di esso un nuovo genere, ovvero una delle fronime riputarlo. Grandemente diffatti le si assomiglia; ma il numero delle antenne, e la loro costruttura me lo fanno bastantemente distinguere. Ho voluto poi intitolarlo al mio compatriota barone A. Bivona Bernardi, com' ella sa, delle cose naturali della Sicilia illustratore amplissimo."

In the "Spiegazione della Tavola," he gives:—

"*Fig.* 2. *Orione becco d'uccello.* (*a*) *Capo di esso ingrandito che presenta la parte di sotto.* (a^2 a^2) *Piedi mascellari esteriori.* (*b*) *Coda con gli stili indrandita* [ingrandita].

"*Fig.* 3. *Bivonia zanzara.* (*a*) *Sua lunghezza naturale.*

Cocco's genus *Orio* is evidently synonymous in part with *Oxycephalus*, Milne-Edwards, 1830; while his *Orio zancleus* coincides generically with *Eupronoë*, Claus, 1879; and his genus *Bivonia* clearly belongs to the Phronimidæ, which will be discussed later on in this Report. Milne-Edwards, Hist. des Crust., vol. iii. p. 98, supposes that Cocco's *Orio* may be the same as Risso's *Typhis*, an opinion rejected by de Natale. See note on that writer, 1850.

1832. Guérin, F. E.

Expédition scientifique de Morée. Section des sciences physiques. Tome III. —1.re Partie. Zoologie. Deuxième Section.—Des animaux articulés. Par M. Brullé, membre de la commission scientifique de Morée; Les *Crustacés* par M. Guérin. Paris, 1832.

The general introduction to this part says, "Aucune classe d'articulés ne prouve mieux que celle des Crustacés combien la Morée est quelquefois pauvre en objets nouveaux." On pages 44–46 Guérin gives the Amphipoda numbered as follows:—"47 Talitrus saltator, Miln.-Edw.," "48 Orchestia Fischeri, Miln.-Edw."

"49 Talitrus platycheles Guér.—Corpore compresso, glaberrimo; pedibus pare primo secundoque æqualibus.—Long. 2 centim.—(Voyez notre Pl. XXVII.)

"Cette espèce remarquable pourrait à la rigueur constituer un nouveau genre, qu'on devrait placer entre les Talitres et les Orchestes, si on prenait pour caractères génériques l'organisation des deux premières paires de pattes; en effet, chez les deux genres que nous citons, les quatre premiers pieds sont terminés par un ongle crochu et pointu, tandis que dans notre espèce les seconds pieds n'ont plus d'ongles à l'extrémité; ils sont d'une consistance membraneuse, très-plats, transparens, et dépourvus des épines qu'on observe aux autres pieds; nous n'avons cependant pas cru devoir faire un nouveau genre pour ce petit amphipode, nous le plaçons parmi les Talitres, et nous établirons pour lui une petite division, à l'exemple de M. Milne-Edwards (Ann. des sc. nat., t. 20, p. 364.), ce qui apportera une légère modification dans le tableau que ce naturaliste donne des espèces du genre Talitre; voici ce tableau modifié:

"*A.* Pattes de la prèmiere paire beaucoup plus grandes que celles de la seconde. *T. locusta* (Voyez notre Pl. XXVII. fig. 4*e.*), *Baucoudraii.*

"*B.* Pattes des première et seconde paires égales entre elles. *T. platycheles.*

"*C.* Pattes de la première paire beaucoup moins grandes que celles de la seconde paire. T. Cloquetii. (Voyez notre Pl. XXVII. fig. 4*f.*).

"On voit par ce tableau que notre Talitre est très-facile à distinguer des autres espèces connues; ses antennes sont plus courtes, proportion gardée, que celles du T. locuste; ses premières pattes sont fortes, à articles cylindriques, et terminées par un crochet simple, qui ne peut se replier en dessous. Les secondes sont de la méme longueur, membraneuses et transparentes, avec leurs deux derniers articles presque égaux, aplatis, de forme ovalaire alongée; le dernier ne nous a pas offert de crochet terminal, quoique nous l'ayons placé sous une très-forte loupe. Les pattes de la troisième paire sont de forme ordinaire, plus longues de moitié que celles qui précédent. Celles de la quatrième paire ont à peu près la longueur des deux premières. Les suivantes sont encore plus courtes, robustes, garnies d'épines; enfin les deux dernières paires sont les plus longues et dépassent notablement celles de la troisième paire.

"Hab. Cette espèce a été trouvée à Modon; nous l'avons aussi reçue du golfe de Gênes, et des mers de la Corse.

"50 Gammarus peloponnesius Guérin.—Antennis inæqualibus, posticis cupulis instructis; pedibus quatuor anticis subæqualibus, subcheliformibus, cæteris longioribus, æqualibus.—Long. 13–16 millim."

"51 Gammarus locusta Leach." This is followed by the Læmodipodes, represented by "52 Caprella lobata—*Squilla lobata*, Müller."

In the account of *Gammarus peloponnesius*, he criticises Milne-Edwards' division of the genus *Gammarus*, "car la Crevette des ruisseaux (*G. fluviatilis*), qu'il place dans la division où

le cinquième anneau de l'abdomen doit être lisse, a cependant ce segment garni d'un faisceau d'épines ou de poils raides, comme sa Crevette ornée et comme notre Crevette de Morée ; en sorte que ces espèces doivent être placées, de moins quant à ce caractère, dans la même division." He then proceeds to call attention to the appendages of the antennæ since called calceoli, which his species has in common with *Gammarus ornatus*. The characters by which he distinguishes the new species are in fact only the comparative shortness of its upper antennæ and magnitude of its first gnathopods.

In the Brit. Mus. Catal., Spence Bate comments on the fact that Guérin has figured the mandible of *Talitrus platycheles*, with a very minute appendage (see Note on Atlas to this work, under date 1835). "This is a feature," Sp. Bate says, "that is absent not only from the genus, but from the whole tribe of SALTATORIA." It will be remembered, however, that Savigny has likewise figured such an appendage for the mandible of *Orchestia montagui*. In the Iconographie des Crustacés Guérin appears to have used Savigny's figure of this mandible, and therefore his testimony is perhaps not independent.

1832. SCHLOTHEIM.

Merkwürdige Versteinerungen aus der Petrefactensammlung des verstorbenen wirklichen Geh. Raths Freiherrn v. Schlotheim. Mit 66 Kupfertafeln. Gotha, 1832.

In this reprint at page 22 is mentioned in the description of Tab. xxii., "Fig. 8. *a. b.* Trilobites problematicus. Aus den jüngern Schichten des zur Kupferschieferformation gehörigen Kalksteins bei Glücksbrunn." The original figures are reproduced on the plate named.

1832. ZENKER, JONATHAN CARL.

De Gammari Pulicis, *Fabr.* historia naturali atque sanguinis circuitu commentatio. Accedit Tabula Ænea. Jenæ, 1832.

Zenker believes that Degeer "(quem vulgo De Geer falso scribunt)", Gruithuisen, Mayer, Wagner (*Isis*, 1832, III), had observed the circulation of the blood in *Gammarus pulex* before him.

His section prior on the natural history of *G. pulex*, Fabr., begins with a "*Conspectus generum præcipuorum familiæ Squillarum, cui Gammarus noster adnumerandus est.*" Thus :—

"A. Antennæ quatuor

"*a*) antennæ inferiores haud in pedis modum effictæ, pluries articulatæ.

"*aa*) antennæ superiores inferiores subæquales.

"1. Pollices manuum sic dictarum anteriorum 2-articulati :
Cerapus et Lewothoë.

"2. Pollices manuum anteriorum 1-articulati :
Melita, Erichthus, Squilla, Phasmatocarcinus, Amphithoë, Dexamine, Gammarus et Pherusa.

"*bb*) antennæ superiores inferioribus breviores ;
Orchestia, Talitrus et Atylus.

"*b*) antennæ inferiores magnæ pedum instar efformatæ (pedatæ), vix 4-articulatæ :
Corophium, Podocerus et Jassa.

"B. Antennæ duæ ; *Phronima.*"

He observes that many of the little animals belonging to this family are phosphorescent, as the *Phasmatocarcini* and perhaps the *Amblyrhynchi*, *Erythrocephali*, *Acanthocephali*, &c.

Under the heading *Systematica, Synonymica et Diagnostica* he gives:—

"1. *Classis:* Insecta *L.*, etc., Crustacea *Cuv.*; Polymeria *Goldf.*

"2. *Ordo:* Aptera *L.*; Agonata *Fabr.*; Decapoda *Goldf.*; Inseeta imperfecta *Zenk.*

"3. *Familia:* Amphipoda *Cuv.*; Anthocephala *Dumeril;* Squillares *Goldf.;* Gammarinæ (Cervettines) *Latreille;* Squillæ *Zenk.*"

For the synonyma he refers to *Gronov. Zooph.*, no. 990. *Schwenkfeldt* ther. Siles. p. 557. Onomast. hist. nat. vi. 706. *Buster* (An Gammarus marinus?). Raj. ins. p. 44. *Frisch*, *Geoffroy*, *Klein*, *Roesel*, *Degeer*, *Linné* Syst. nat., ed. xii. T. v. p. 2992, n. 81. *Scopoli*, &c. *Herbst. Linn.* Faun. Suec. 2. 241. *Müll.* zool. dan. prodr. n. 2366. *Blumenbach. Fabric.* syst. entom. 1775. *Oken*, *Cuvier* le règne anim.; übers v. Schinz. III, 68. Nat. f. Sch., p. 725. Dict. des sciences chez Levrault xi., 408, and Leach (Gammarus aquaticus) Edinb. Encycl. vii.

He quotes the *diagnosis generis Gammari* of *Fabricius*, 1778, *Leach* (Linn. Transact. xi. 2, 1815), *Oken* (Naturg. f. Schulen, p. 725), *Cuvier* le règne anim.; trans. by Schinz), and his own "Antennæ quatuor, anticæ (inferiores) breviores, posticæ (superiores) longiores cum ramo parvo accessorio, utræque articulatæ. *Zenk.*," in which it will be observed that, like Fabricius, he applies the terms *anticæ* and *posticæ* to the lower and upper antennæ respectively (see Note on J. C. Fabricius, 1798). He criticizes with some justice the earlier diagnoses, and gives a brief account of the distinctions between those genera in his Conspectus which he considers to come nearest to *Gammarus*. He then gives the diagnosis of the species "*G. Pulex Fabr.*" by *Linné*, *Scopoli*, *Fabricius*, *Oken*, *Cuvier*, *Leach*, winding up with his own, in which he distinguishes two varieties, α) *longicaudatus*, β) *brevicaudatus*. In the description he applies the term *femur* (in preference to *coxa*) to the first joint of the leg. Of the six free joints he calls the first *tibia*, the second *tarsus*, the three following *metatarsus*, the last of these being terminated by an *unguis*.

The second section is on the Sanguinis circuitus, as to which his conclusions are not entirely in agreement with modern investigation. He sums up the results of his paper as follows:— 1. For the numerical law in all the external parts of Gammarus Pulex, the *ternary* arrangement is found to be the predominant, the *quinary* the subordinate. [See p. 13. Totius corporis annuli 3. 5 = 15. *a*) caput cum collo 3. *b*) pectus 3. *c*) abdomen superius 3. *d*) abdomen inferius 3. *e*) cauda 3. &c. &c.] 2. The creature has three species of parasites, two internal, in the blood, orange-coloured, surprisingly large in proportion to their host, and one external, louse-like, almost microscopic. 3. The dorsal vessel is rather to be compared with the swim-bladder of fishes than with a heart. 4. There are no special blood-vessels, but the blood flows freely round all the organs in the cavity of the trunk. 5. The globules of the blood are not animated (and therefore are not to be compared with monads). The last statement is in opposition to Mayer, Suppl. zur Lehre vom Kreislaufe, 1827, some of whose statements he quotes with derision.

1833. Bouchard-Chantereaux.

Catalogue des Crustacés observés jusqu'à ce jour à l'état vivant dans le Boulonnais. (Soc. d'Agric., du Comm., et des Arts, de Boulogne-sur-mer, années 1831 et 1832. Boulogne, 1833.)

"Il cite les 5 espèces suivantes: Talitrus locusta Lmk. Orchestia littorea Desm. Melita palmata Desm. Gammarus pulex Lin. Proton pedatum Desm." (M. Edouard Chevreux *in litt.*)

1833. Cocco, Anastasio.

Descrizione di alcuni Crustacei di Messina per Anastasio Cocco, Giornale di Scienze Lettere e Arti per la Sicilia. T. XLIV. Anno XI. Ottobre Novembre e Dicembre. Palermo, 1833.

At page 113 he says, "È da grandissimo tempo che mi è noto un Orione, e già appellailo *orio zancleus* (Effem. n. VI. pag. 207) indicandone insin d'allora i principali caratteri, chè dagli altri il distinguessero: ed ora vò qui completamente descriverlo.

"*Orione Zancleo* Orio Zancleus—*Corpore conico subrotundato cinereo-rufescente, punctulis fuscis vix conspicuis adsperso—Capite obtuso oculis maximis semilunatis nigrescentibus.*

"Perviene questo Orione infino alla lunghezza di otto linee, ed alla larghezza di tre: ha il corpo conico quasi rotondato cinericcio-carnicino sparso in tutto di minutissimi punti bruni. Il capo aggnaglia la quarta parte o poco più dell' intiera lunghezza: è alquanto compresso, declive, ed ottuso. Gli occhi son grandissimi, bruni, semilunati, colla convessità volta in avanti. Il torace è costrutto di sette segmenti de' quali i due anteriori sono più ristretti: son tutti forniti nel margine inferiore d'un appendice quadrilatera cui appicansi gli arti. L'addome ne ha cinque più larghi de'primi: di questi gli ultimi due sono più ristretti: i margini inferiori sono rotondati, e gli angoli postico-inferiori ottusi, l'ultimo segmento e scavato sul dorso, e questo incavo prolungasi infino all'apice della squama codale—I piedi mascellari son poco meno, o tanto lunghi che il corpo, e compongonsi di quattro articoli quasi uguali—I *piedi-mani* son cortissimi, i quattro segmenti assai dilicati, le tre ultime paia hanno le cosce aderenti ad una squama: l'ultima è delle altre più piccola, ed in essa il piede è eziandio cortissimo: le ugne in ciascun piede sono acutissime. I piedi natatori terminano con un appendice bi-partita. La squama codale terminale ha forma triangolare coll' apice assai acuto, e sorpassa appena la lunghezza delle tre appendici styliformi bi-partite, che stanno in ogni lato della coda: quelle delle due prime paia sono ristrette ed acutissime, e l'altre dell' ultimo paio per alquanto rotondate terminano pure acutamente.

"Quest' Orione abondevolissimamente vien dalle onde gittato in sulla spiaggia, assieme al mio *Orio Ornithoramphus* ed all' *O: Oxyrhingus* (Prestandrea) (1) i quali però son men communi. [(1)[1] I caratteri specifici premessi dal Prestandrea alla discrizione di questo *Orione* non possono nè punto nè poco convenirgli; conciossiachè sieno quelli stessi per me assegnati al mio genere *Orio* e tali quali leggonsi nel nom. VI. dell *Effemeridi scientifiche, e letterarie per la Sicilia*—A far meglio adunque dovrebbero cosi venire indicati—*Corpore compresso—Roseo—Capite in rostrum acutissimum producto—Oculis magnis, semilunatis, nigrescentibus.* N.]

"Un esame diligente de' tre orioni mi fece accorto, che i caratteri per me a questo genere assegnati, era forza si riformassero; poichè i piedi *squamigeri* non al numero di due paia, ma si di tre costantemente in quelli si rinvengono—Un buon carattere generico è pur quello della forma del primo articolo de' piedi mascellari; perchè questo mio genere vò abbia i caratteri seguenti: *Orio—Capite fornicato*, Pedibus maxillaribus longissimis capillaribus, replicatis, capite obtectis, quatriarticulatis, articolo basilari apice dilatato compresso. Binis pedum articorum paribus, chelatis, brevissimis, tribus posticis basi squamâ instructis. Caudâ styliferâ. Effem. scient. e lett. per la Sic. Tom. VI. pag. 11."

"Fig. 3ª„ *a* Orio Zancleus alla grandezza naturale."

[1] Footnote.

1833. Griffith, Edward, and Pidgeon, Edward.

The Animal Kingdom arranged in conformity with its organization, by the Baron Cuvier. With supplementary additions to each order, by Edward Griffith. Volume the thirteenth. London, MDCCCXXXIII. The Classes Annelida, Crustacea, and Arachnida, arranged by the Baron Cuvier, with supplementary additions to each order, by Edward Griffith, F.L.S., A.S., &c., and Edward Pidgeon Esq. London, MDCCCXXXIII.

The Third Order of Crustacea, Amphipoda, and the Fourth Order, Læmodipoda, pages 204–215, are described "from the text of Latreille." The supplement deals with these Orders on pages 315–318, but supplies no new or original information.

1833. Johnston, George.

Illustrations in British Zoology. The Magazine of Natural History. London. Vol. VI. 1833. London, 1833. pp. 40–43.

He here figures and describes *Caprella acuminifera*, from Berwick. He remarks, "I do not know to whom the discovery of the animal just described is due; it is probably to Montagu." In the eighth volume of this Magazine, page 670, under *Caprella acanthifera*, Leach, he gives as a synonym "Cap. acuminifera *Desm.*, Crust., 277; Johnston, in Mag. Nat. Hist., vi. 40. fig. 7. *a*." But though the *Caprella acuminifera* of Desmarest is the same as *Caprella acanthifera*, Leach, the species which Johnston names at first *acuminifera* and then *acanthifera* is, Mayer says, indubitably *Protella phasma*, Montagu.

1833. Prestandrea, Nicolò.

Su di alcuni nuovi crustacei dei mari di Messina. Memoria di Nicolò Prestandrea chimico-farmacista messinense. Effemeridi scientifiche e letterarie per la Sicilia. N. 16. Aprile 1833. Tomo VI. Anno secondo *Aprile Maggio e Giugno*. Palermo, 1833.

In this paper, pages 10–12, the following notices occur:—

"Anfipodi. *Scinà . . . Corpore trigono carinato, marginibus reliratis; segmentis sex anterioribus latioribus, quatuor posterioribus angustioribus.—Pedibus quatuordecim simplicibus, puto articulo quinto paris omnium longioris ultra articulationem prolungato.—Capite truncato inclinato. Cauda stilifera.*

"4.—*Scinà ensicorne.*—Corpo trigono col piano inferiore più largo de' laterali, lungo cinque linee, carenato sul dorso: margini laterali rilevati, il colorito del corpo è rosso arancio intenso, sebbene nel mezzo presenta uno o due semmenti biancastri. Capo troncato, inclinato, con due linee rilevate divergenti, che partendo dal principio della carina, ove formano un angolo acuto, terminano alla base delle antenne superiori.—Antenne superiori ensiformi, triangolari sino alla metà della loro lunghezza, col l'angolo inferiore dentillato alla base, lunghe tre linee, e mezzo, color di carne con due linee di punti rosso arancio: sono sostenute da un corto peduncolo cilindrico. Antenne inferiori capillari, bianche molto più lunghe de' superiori, formate da sei articoli, il primo de' quali è molto più lungo degli altri. Occhi picciolissimi, rotondi, rosso-arancio posti sul lato esterno alla base delle antenne superiori.

—Torace di setti semmenti, che crescono gradatamente in larghezza sino al quinto: il sesto, e settimo sono più stretti.—Addome di quattro anelli più stretti, ma più lunghi di quelli del torace, in giusacchè l'insieme dell' animale si vede come diviso in due pezzi, cioè: il mezzo anteriore più largo, il posteriore abbruttamente ristresto.—Sette paja di piedi propriamente detti, semplici, gracili, che conservano nella loro lunghezza l'ordine de' semmenti del torace: il quinto pajo più lungo di tutti è dentillato nel lato esterno per tutta la lunghezza del secondo articolo, che nel lato interno si prolunga oltre l'articolazione in una punta acuta.—La coda porta sei stili molto sottili; quattro inserti sulla stessa linea, e le altre due laterali alquanto più sotto, e sono più lunghi di quelli.

"Di questi bellissimo *crustaceo*, che viene dalle onde in febbrajo balzato in sulla spiaggia insieme ad altri individui appartenenti a' generi *Phrosina Phronima Tiphis Phillosoma* ho creduto farne un nuovo genere, perciocchè la conformità del capo, il corpo trigono, le antenne esteriori forti, triangolari, ed i piedi del quinto pajo lo fanno da qualunque altro genere degli *anfipodi* abbastanza differire.

"Ho voluto dedicarlo al dottissimo abbate Cav. Domenico Scinà, qual celebre conoscitore delle scienze naturali.

"Anfipodi. *Orio* (1) *Oxyahingus—Capite fornicato—Palibus maxillaribus exterioribus, longissimis, capillaribus, replicatis, capite obtectis—Binis pedum anticorum paribus didactylis, brevissimis, reliquis simplicibus; binis posterioribus basi squama instructis—Cauda stilifera.* [(1)[1] Questo nuovo genere di fresco stabilto per il sig. Cocco, e che nel fascicolo sesto delle Effemeridi Scientifiche, e Letterarie per la Sicilia dell'anno 1832 trovasi posto, credo per errore tipografico, nell' ordine de' *Schizzopodi Erioftalmi*, devesi noverare nell' ordine degli Anfipodi, come ne conviene l'istesso Autore.]

"Corpo lungo sei linee, e largo meno di una, alquanto compresso, costantemente color di rosa, molle, composto di sette semmenti toracici, e cinque addominali più grandi, che impiccioliscono inverso la coda. Quest' ultimi terminano co' loro margini postico-inferiori appuntati. Capo ovoideo, inferiormente tagliato in forma di becco da penna da scrivere molto sottilmente allungato, e questo agguaglia la lunghezza del capo.—Gli occhi sono grandi semilunati nerastri. I piedi mascellari esteriori della lunghezza del corpo sono composti di quattro lunghi articoli de' quali il basilare è allargato all' apice.—I piedi-mani sono cortissimi, gli altri quattro sono sottili, terminati da una picciola unghia acutissima, e le ultime due paja hanno alla base una squama ovale.—La squama intermedia ovale-oblunga sostiene da ogni lato tre stili bifidi decrescenti in grandezza dalla base all' apice di essa.

"Trovasi in sulle spiagge di Messina balzato dalle onde in marzo.

"Differisce dall' *Orio Ornithiramphus* (Cocco) per avere il corpo più picciolo, alquanto compresso, di color constantemente roseo, il capo assai sottilmente allungato, gli occhi grandi, semilunati, e li stili della coda proporzionatamente più grandi."

In the above account *Oxyahingus* is apparently a misprint for *Oxyrhingus*, see note on Cocco, 1832. *Oxyrhingus* itself, we may suppose, is a malformation for *oxyrrhynchus*. The genera and species mentioned in this paper belong to the Hyperina, to be discussed in the later portion of this Report. The *Orio oxyrhingus* clearly belongs to the Oxycephalidæ.

1834. DEWHURST.

The natural history of the order Cetacea and the oceanic inhabitants of the Arctic regions. 1834.

Lütken, 1873, quotes a passage from page 199 of this work alluding to *Cuiscus ceti*, L., the *Cyamus mysticeti*, Lütken, parasitic on *Balæna mysticetus*, being no doubt intended. From page

[1] Footnote.

259 he quotes the observation that "the narwal is liable to the annoyance of a similar but smaller animal," but remarks that Dewhurst must certainly be wrong in the opinion which he expresses on the same page 259, that all species of whales are tormented by whale-lice.

1834. MILNE-EDWARDS, HENRI.

Histoire naturelle des Crustacés, comprenant l'anatomie, la physiologie et la classification de ces animaux. Tome premier. Ouvrage accompagné de planches. Paris, 1834.

The Introduction, pages i.–xxxv. is chiefly occupied with an interesting sketch of the literature of Carcinology down to the date of the work then in hand. The First Part, pages 1–200, in the first chapter, discusses the position of Crustacea in the animal kingdom, the character and various adaptations of the Crustacean integument, and its exuviation; in the second chapter, nutrition, respiration, circulation, and secretions; in the third chapter, the organs of sense, the nervous system and the muscles; in the fourth, the apparatus of reproduction and the process of development. In the Second Part, the first chapter, pages 201–236, describes the different systems and methods employed up to that date in the classification of Crustacea, concluding with that preferred by Milne-Edwards himself.

Milne-Edwards considers the normal number of segments of the Crustacean body to be twenty-one, the same segment never carrying more than one pair of limbs. Each segment he composes theoretically of two arcs, an upper one constructed out of two tergal pieces with an epimere or side-plate on either side, and a lower one constructed of two sternal pieces with an episternum on either side. He says that M. Audouin has arrived at this general principle, "*que ce n'est que de l'accroissement semblable ou dissemblable des segmens, de la réunion ou de la division des pièces qui les composent, du maximum de développement des uns, de l'état rudimentaire des autres, que dépendent toutes les différences qui se remarquent dans la série des animaux articulés.*" After discussing the number of distinct segments in various groups of Edriophthalma, he concludes by saying, p. 22, "Enfin nous ajouterons que dans certaines espèces d'Amphipodes les deux moitiés latérales du septième anneau abdominal ne se réunissent pas sur la ligne médiane comme dans les autres segmens du corps, et qu'il prends alors la forme de deux petites lames cornées ou de deux appendices styliformes, disposition très-curieuse en ce qu'elle offre un exemple frappant de la division d'un anneau en deux moitiés symétriques et laterales," with the following note, "Cela se voit dans la Crevette d'Othon E., la Crevette locuste L, etc.; mais, dans la plupart des Amphipodes, ces rudimens des septièmes segmens abdominaux manquent complétement. (*Voy.* Pl. 1, fig. 5.)," as though he thought that the presence of a telson in the Amphipoda was the exception, whereas in the limits of this order which he accepted there is no instance of its absence which can be regarded as certain.

The appendages when fully developed, he says, present three distinct parts; the main portion, la tige, the stem which carries the other two and is almost always composed of several joints placed end to end; the second, or palp, is an appendage of the stem, on the outer side of which it almost always takes its origin, generally from the basal joint, but sometimes at the extremity of the second or third joint; the third portion, le fouet or flagellum, also arises from the stem, separating from it always above and on the outer side of the palp, p. 45. "In the natural group of the Amphipoda, the thoracic limbs almost always present in the females the maximum of composition above-mentioned; the stem serves for locomotion; the flagellum becomes membranous and serves for respiration; lastly, the palp takes

the form of the flagellum of the maxillipeds of the crabs, and serves to retain the eggs in the thorax of the mother," p. 49.

The Crustacean mouth-opening is described, p. 61, as bounded in front by a small horny or bony plate called the labrum or upper lip, and behind by a plate, generally bifid, called the tongue, *languette*, but which "might better be called the lower lip." The sides of the mouth are occupied by the mandibles, "which often carry an articulated appendage, that has been called the mandibular palp, but which appears to be the continuation of the stem of the limb, and not the analogue of the part above-called the palp." After treating of the maxillæ and maxillipeds, he comes to the *Canal digestif*, which runs from the mouth to the anus, which is always in the terminal segment. This canal is composed of three parts, the œsophagus, stomach and intestine. In the Edriopthalma he observes that the stomach is constructed on essentially the same lines as in the Podophthalma. He notes, p. 72, that in *Orchestia* "there exist in the anterior part of the stomach, near its œsophageal opening, two little ciliated teeth." These are the structures for which in this Report the expression *triturating organs* has been adopted. On page 80 he remarks that "in the Amphipoda and Læmodipoda it is the flagella (*les fouets*) of the thoracic limbs that appear specially assigned to the exercise of the respiratory functions; these organs, from eight to twelve in number, take the form of large membranous vesicles suspended below the thorax between the ambulatory feet, and a current of water set in motion by the natatory feet of the abdomen continually bathes them."

In describing the antennæ of Crustacea, p. 111, he says that the *tige* or stem is composed in general of a stouter part called the peduncle, with one, two, or three joints, and a more or less elongate terminal portion, many-jointed, which he calls "*tige terminale*." The "palp" takes the form either of a second terminal multiarticulate lash, fixed at the extremity of the peduncle, or of a large horny plate inserted at the base of the antenna, while the remaining accessory portion, when present, also constitutes a terminal lash (*un filet terminal*).

He notices, p. 113, that the Crustacea known under "le nom de *Talitres* ou de *Puces de mer*" must have the sense of smell, as they gather round decaying food after it has been buried. On p. 116 he gives the following account of the eyes as examined in "*Amphitoe Prevostii*" and a few other Edriophthalma; "chez ces animaux on trouve d'abord pour chaque œil composé une cornée lisse sans division; mais immédiatement derrière cette lame tégumentaire il existe une seconde tunique, de même nature et également transparente, qui y adhère intimement, et qui est divisée en une multitude de facettes hexagonales; derrière chacune de ces facettes ou cornéules est situé, comme d'ordinaire, un cristallin dont la face antérieure est convexe et dont la face postérieure, qui se prolonge en un cône à sommet obtus, est contiguë à un petit cylindre gélatineux, avec lequel le filet correspondant du nerf optique se confond." On p. 121 he says that in *Cyamus* there are two smooth eyes and two compound facetted eyes, as to which see Note on Savigny, 1816. He repeats the account of the nerve-system of *Talitrus* from a paper by Audouin and himself read in 1828, and at page 147 he says that, combining Rathke's observations with theirs, "on peut conclure que *le système nerveux des Crustacés se compose toujours de noyaux médullaires dont le nombre normal est égal à celui des membres, et que toutes les modifications qu'on y rencontre, soit à diverses époques de l'incubation, soit dans différentes espèces de la série, dépendent principalement des rapprochemens plus ou moins complets de ces noyaux, agglomération qui s'opère des côtés vers la ligne médiane, en même temps que dans la direction longitudinale; mais peuvent tenir aussi en partie à un arrêt de développement dans un certain nombre de ces noyaux.*"

In the chapter on development it is remarked, page 199, that among the Edriophthalma the head is much larger [proportionally] in the young than in the adults, that the abdomen often shows analogous differences, and that when in the adult one of the pairs of feet exhibits some peculiarity of structure, the anomaly is either not found, or is little apparent, in the

young. It should be remembered that throughout this portion of the work the Crustacea in general are dealt with, and that therefore, when the Edriophthalma are not being described in especial, many of the observations made are calculated to throw light upon their structure.

In the chapter on classification, after noticing earlier systems, Milne-Edwards explains his own. He prefers the zoological method which is not daunted by great differences of structure from grouping animals of high organization with others in which it may be far less complex, yet of the same general type and recalling "les états transitoires par lesquels les êtres les plus parfaits de la série ont passé pendant la durée de leur vie embryonnaire." He gives the definition of the class as follows :—

"Crustacés. *Animaux ayant le corps divisé en anneaux, en général très-distincts, mobiles et d'une consistance assez grande (cornés ou calcaires), sans squelette intérieur proprement dit, et portant une double série de membres, presque toujours bien distinctement articulés, et constituant des antennes, des mâchoires, etc., et des pates dont le nombre est, le plus ordinairement, de cinq ou de sept paires; le système nerveux, en général bien distinct, ganglionnaire et longitudinal; la respiration en général aquatique, et se faisant toujours à l'aide de branchies ou de la peau; la circulation, en général bien distincte; presque toujours un cœur aortique et des vaisseaux sanguins propres; les sexes separés.*" p. 231.

He makes three subclasses, namely the Crustacés maxillés, Crustacés suceurs, and Crustacés xyphosuriens. The first of these he subdivides into various legions, the first of which, les Podophthalmiens, contains two orders, the Decapods and Stomapods, while the second, les Edriophthalmes, contains three orders, the Amphipods, Isopods, and Læmipods.

It is in treating of the Decapods, p. 243, that he mentions the designations which he says are often applied to the six joints into which the ambulatory foot is commonly divided. These terms are 1. *hanche*, 2. *trochanter*, 3. *cuisse* or *bras*, 4. *jambe* or *carpe*, 5. *metatarse*, 6. *tarse* or *doigts*. The last two of these sometimes, "disposés en manière de pince," form a hand (*main*).

The Atlas, plate xi. fig. 1, repeats the diagram of the nervous system of *Talitrus* given in the earlier work.

1834. Roussel de Vauzème, Augustus.

Mémoire *sur le Cyamus ceti* (Latr.) *de la classe des Crustacés.* Annales des Sciences Naturelles. Rédigées pour la Zoologie par MM. Audouin et Milne-Edwards. Seconde Série. Tome premier.—Zoologie. Paris, 1834. pp. 239–255. 257–265. Pls. 8. 9. Fig. 19.

The author explains that he was able to study these parasites from a great number of whales harpooned under his own eyes in the Atlantic, in the neighbourhood of Tristan da Cunha, and off the Falkland Islands. He distinguishes three species, which he thinks had been hitherto confounded by authors under the same name. Lütken points out that all the three species are distinct from the northern *Cyamus mysticeti*, with which Roussel de Vauzème supposes his *Cyamus ovalis* to be identical. Of this species the anatomy is very fully described. The mistakes of Savigny and Treviranus are pointed out. Among other details of his own investigations, he says, "Des perquisitions inutiles pour trouver les glandes salivaires, m'ont fait remarquer souvent dans les tuniques de l'estomac des matières blanches, friables, de forme variée, dont je n'ai pu déterminer la nature, à moins qu'elles ne soient analogues aux pièces calcaires qu'on présume servir à la réparation du test chez les crustacés." He remarks that there is "parmi les viscères une membrane diaphane, parsemée de points

noirs en relief, interposée entre le vaisseau dorsal et le tube digestif." He notices the different authors who have written about *Cyamus*, and the various names and systematic positions which have been assigned to it. He himself considers that it comes nearest to the Isopoda, though it ought not to be united with them. He objects to the term Læmodipoda, because the anterior feet are affixed to a special segment, not to the head or neck, as that epithet would imply. After a definition of the genus *Cyamus*, he defines his three species; 1. *Cyamus ovalis*, of which he says, "cette espèce vit agglomerée sur les éminences cornées de la tête des Baleines franches (*Balæna mysticetus*)," herein, Lütken says, going astray; 2. *Cyamus erraticus*, of which he says, "il vit errant, on le trouve sur la peau lisse, à la base des tubercules cornés, sur les nageoires, principalement aux aisselles et dans les plis des parties génitales et anales;" 3. *Cyamus gracilis*, of which he remarks, "il demeure avec les Cyames ovales sur les protubérances de la tête." In a chapter on their "manners and customs," he speaks of the prodigious quantity of the *Cyamus ovalis* and *Cyamus gracilis* which can be seen a good way off at sea whitening the head of a whale, when it comes up to breathe. He had reason to think that they must cause the whale no little irritation with their sharp claws. Some care is needed in their capture, since these claws penetrate the human finger like a needle, causing a sharp pain. Cutting the branchiæ did not seem to affect these animals, but when their large anteunæ were cut, they would sway uneasily about, as if they were drunk. He never found any in the stomach of the Albatrosses or other sea-birds, which are sometimes supposed to help the whales to get rid of the parasites, but he believed that the winter storms might be highly useful in this respect. He decisively rejects the suggestion of MM. Audouin and Milne-Edwards that the *Cyamus gracilis* might only be the young of the other species.

1835. Gervais.

Note sur deux espèces de Crevettes qui vivent aux environs de Paris. Annales des Sciences naturelles. Seconde Série. Tome quatrième.—Zoologie. Paris, 1835. pp. 127–128.

The Crevettes d'eau-douce, he says, have been confounded under the names *Gammarus pulex*, *aquaticus* or *fluviatilis*, as forming but a single species, whereas they really form two species, differing not only by zoological characters, but also by their habits. "Jamais elles ne s'accouplent ensemble, et l'une a sur le dessus des anneaux de l'abdomen des épines que l'autre ne présente pas." Roesel and Geoffroy have described and figured the one, Desmarest and Zenker have figured the other. The former he proposes to call *Gammarus Roeselii*, because the names *fluviatilis* and *aquaticus* are inappropriate, since there is another river Gammarus, and all the Gammari are aquatic. His definitions are "Gammarus pulex, Fabr. *Oculis reniformibus, antennis subæqualibus; lingulo quoque abdomis* [cingulo quoque abdominis] *lævi, id est non spinigero,*" and "*Gammarus roëselii* Nobis. *Oculis ac antennis gammari pulicis, sed abdominis cingulo quoque aculeato, id est supernè et posticè unispinigero. Astacus fluviatilis* Roësel. Insecten *belistegungen* III. pl. 52. *Crevette des ruisseaux* Geoffroy. *Hist. des Insectes* pl. 21. fig. 6." I do not for my own part consider Gervais justified by the reason he gives in altering Rösel's name. What he states as to the two species never mating is guarded in a note by the remark that such a thing might happen, without disproving the distinctness of the species.

Gervais concludes as follows:—"On trouve aussi dans les environs de Paris, mais seulement dans l'eau de puits, une troisième sorte de Crevette, remarquable par la petitesse de sa taille, qui ne dépasse pas en effet trois ou quatre millimètres. Cette Crevette, que nous considérons comme une simple variété de séjour est constamment étiolée, et ses yeux, au lieu d'être

noirs, comme chez les précédentes, sont tout-à-fait sans pigmentum et non apparens. Nous la nommerons *Gammarus pulex minutus*, parce que c'est en effet à l'espèce sans épines qu'elle appartient." As to this see note on Koch, 1835.

1835. Guérin-Méneville.

Expédition scientifique de Morée. Atlas, 1831–1835. Paris, 1835.

On page 3, in the description of Pl. XXVII., what relates to the Amphipoda is thus given :— "Fig. 4. *Talitrus platichelis*, Guérin ; voy. p. 44. Grossi ; *a* dernier segm. de l'abdom. plus grossi ; *b* mandibule très-grossie ; *c* une patte de la seconde paire très-grossie ; *d* patte antérieure du *Thalitrus locusta* grossie ; *e* celle du *Thalitrus Cloquetii* également grossie. —Fig. 5. Gammarus *peloponnesiacus*, Guérin voy. p. 45. Grossi ; *a* partie d'une antenne externe très-grossie." On Pl. XXVII. itself, which has the inscription "E. Guérin pinxt," there is no figure 4. d. Figures 4. e. and 4. f. represent not single feet but the whole anterior portion, head, antennæ, gnathopods, etc., of two Orchestidæ, the former copied from Desmarest's copy of Montagu's *Gammarus saltator*, the latter from Savigny's figure of *Talitrus cloquetii* (Audouin). In figure 5, the two last peræopods are represented without side-plates, and attached to the fifth and sixth peræon-segments, while the pleopods are attached respectively to the seventh peræon- and the first and second pleon-segments. The telson appears to spring from the fourth pleon-segment.

1835. Johnston, George.

Illustrations in British Zoology. The Magazine of Natural History. London. vol. viii. 1835. London, 1835. pp. 668–675.

Under "Class Crustacea. Subclass C. mandibulata," Johnston gives a definition, first of the "Legion Edriophthalma," then of the "Order Læmodipoda *Latreille*, in Cuv. Règ. Anim., iv. 126," which he divides into

"(1.) Branchial lamellæ 2 pairs, attached to the second and third segments, which are apodal . . . . . Caprélla.

"(2.) Branchial lamellæ 3 pairs, attached to the base of the second, third, and fourth pairs of legs, which are all monodactyle . . . Próto."

To *Caprella* he assigns "1. *C. Phasma;*" "2. *C. acanthifera,*" with "? var.," Leach's *Cap. linearis*, "in Edin. Encycl., vii. 404," and a reference to Fleming's opinion that it is probably only "a variety of C. Phasma ;" "3. *C. Pennantii;*" "4. *C. linearis.*"

To *Proto* he assigns two varieties of *Proto pedatus*, which he figures and describes. After the fuller description of the species he distinguishes

"*Variety* 1.—Hands oval with a single denticle at the base : head rounded in front : branchial lamellæ larger and elliptical. *Obs.* To this variety the figures of Müller and Montagu belong.

"*Variety* 2.—Anterior hands triangular, somewhat lobed at the base ; the wrist deeply sinuate ; posterior hands oval, with two teeth at the base, and serrulate on the inner aspect : head very obtuse in front : branchial lamellæ smaller and cylindrical. *Obs.* All the specimens I have seen belong to this variety."

"Latreille (Cuvier, Règne Animal, tom. iv. p. 127) and Desmarest assert that the figures of Müller and Montagu refer to distinct animals, which do not even pertain to the same genus. There is some error in this ; for the figures are in reality more closely alike than could have

been anticipated, when it is remembered that they are both original, and taken by different draughtsmen; and they unquestionably represent the same species."

Mayer decides, in regard to the species here given by Johnston, that his *Caprella phasma* and *Caprella acanthifera* are alike *Protella phasma*, Montagu, his *Caprella pennantii* is *Caprella acutifrons*, Latreille, his *Caprella linearis* is rightly named, while his two varieties of *Proto pedatus* both belong to *Proto ventricosa*, O. F. M., the hands in variety 2. having become wrinkled after death. Johnston's figure of this variety, it may be observed, shows the marsupial plates of a female specimen.

1835–1841. Koch, Carl Ludwig, died 1857 (Hagen).

1847. Deutschlands Crustaceen, Myriapoden u. Arachniden. Ein Beitrag zur deutschen Fauna. Herausgeg. von Herrich-Schäffer. Regensburg 1835–1841. Heft 36.

Zusammenstellung der in Koch's "Deutschlands Crustaceen, Myriapoden und Arachniden," daneben so in "Deutschlands Insecten von Dr Panzer und Herrich-Schäffer," vorkommenden Crustaceen, 1847.

Of these works I have only seen portions, and therefore quote the titles and dates as given in Boeck's list. Apparently with a special view to the confusion of Bibliographers, Koch's work was issued in loose leaves. For each species there is a separate plate measuring about five inches in breadth by four in depth, and a separate leaf of description, six and a quarter inches broad by four in depth. A series of these in a loose paper cover forms a *Heft*. On the outside of this cover is the table of contents and the date. The date of the 162d Heft is "Den 1. Oktober 1838." The number of the Heft is repeated on each leaf, and the synonymy invariably gives a reference to "Koch Dtschl. Crust. Myr. u. Arachn.", with a different numbering; thus in Heft 138, the references are to h. 5; in 162, to h. 22; in 180 to h. 34; in 186 to h. 36. Mr. G. K. Fortescue of the British Museum tells me, on the authority of Hinrichs, that Heft 36 was published in 1841. Hagen, Bibl. Ent. ii. 27, states that Georg Wolfgang Franz Panzer (born 1755, died 1829), began his "Faunæ Insectorum Germaniæ initia" in 1793; that Heft 109, the last by Panzer, appeared before 1813; that after a long interval Heft 110 was published by Maler Geyer at Augsburg, and that the continuation was by Gtth. Aug. Wilh. Herrich-Schaeffer (born 1799), the title of his work being "Die Fortsetzung von Panzer Faunæ insectorum Germaniæ initia Regensburg, (Manz), 1829–1844. 8. Heft. 111–190. à 24 tab. col."

Mr. Edward Saunders, the well-known entomologist, informs me that Engelmann, Bibl. Hist. Nat. 1846, quotes the titles thus:—

"Koch, C. L. Deutschlands Crustaceen, Myriapoden, u. Arachniden. Ein Beitrag zur deutschen Fauna, Herausgeg, von (G. A. W.) Herrich Schäffer. 1–40 Heft (Jedes mit 24 lith. u. illum. Abbildgn. u. à 24 Bll. Text) qu. 16. Regensburg, 1835–1841 (Manz)."

"Panzer, G. W. F. dan. Fortsetz. von G. A. W. Herrich Schäffer. 111–190. Hft. Jedes mit 24 illum. Kpfrn (u. zusamm. 1592 Bl. Text) 16. Regensburg, 1829–1844 (Manz)."

From the latter work Mr. Saunders sends me the following synonymy:—

"Gammarus fossarum Koch

Panz.	Faun. Germ. (H. Schff.)	138. 1.
Koch.	Deutsch. Crust. Myr. u. Arach.	5. 1.

"Gammarus puteanus Koch

Panz.	Faun. Germ. (H. Schff.)	138. 2.
Koch.	Deutsch. Crust. Myr. u. Arach.	5. 2.

"Gammarus Pulex. Fab.

Panz. Faun. Germ. (H. Schff.) 186. 21.
Koch. Deutsch. Crust. Myr. u. Arach. 36. 21.

"Gammarus puteanus Koch

Panz. Faun. Germ. (H. Schff.) 186. 22.
Koch. Deutsch. Crust. Myr. u. Arach. 36. 22."

The following descriptions are quoted from the former work. There can be little doubt that the same plates have been used for both works, although, as Mr. Saunders observes, Engelmann applies the term "lith." to those in Koch, and "Kupfrn" to those in Herrich-Schäffer's continuation of Panzer. The two works would seem to be practically identical. It seems convenient to bring Koch's four descriptions together, but it must be remembered that in all probability the two numbered respectively 138.1, and 138.2, belong to 1835, while the numbers 186.21, and 186.22, belong to 1841.

"138. 1. Gammarus fossarum Koch.

"G. testaceus, vitta utrinque laterali fusca, testis caudæ inermibus.

"Squilla Pulex Degeer Abh. VII. p. 193. t. 33. f. 1. 2.

"Frisch. ins. 7. t. 13.

"Koch Dtschl. Crust. Myr. u. Arachn. h. 5. n. 1.

"Etwas schlanker und kleiner als Gamm. pulex; die Schwanzringe oben unbewaffnet, und ohne vorstehende stachelartige Spitzen. Das vorletzte Glied der vier Vorderbeine etwas schmal eiförmig.

"Bräunlich gelb, mit einem dunkelbraunen, bis fast zur Schwanzspitze ziehenden, zuweilen schwächer oder stärker ausgedruckten Seitenstreif, und mit rothen Randstreifchen an den Hüften und an den Seiten der drei vordern Schwanzringe; zuweilen auch ein solches Fleckchen der Länge nach an den Seiten der zwei Endringe.

"Das dunkeler gefärbte Weibchen hat kürzere Schwanzspitzen; auch scheint der Eiersack an den vier vordern Seitenschilden schwärzlich durch.

"In Gräben mit fliessendem Wasser. Bei Regensburg in dem Königswieser Graben und in dem kleinen Bach bei der Weichselmühle in grosser Anzahl."

"138. 2. Gammarus puteanus Koch.

"G. diaphano-albus, lateribus subochraceis, testis caudæ inermibus; articulo penultimo pedum 4 anteriorum quadrato.

"Koch Dtschl. Crust. Myr. u. Arachn. h. 5. n. 2.

"Die Gestalt von Gamm. pulex, aber von diesem durch die fehlenden stachelartigen Spitzen auf den Schwanzringen leicht zu unterscheiden. Von Gamm. foss. unterscheidet ihn das vorletzte Glied der vier Vorderbeine; dieses ist sehr gross, breiter als lang, fast quadratförmig, blattartig breitgedrückt.

"Körper, Fühler, Taster, Beine und Schwanzspitzen etwas glas-artig weiss; in den Seiten bis zum letzten Schwanzringe mit ochergelbem Anstrich, und mit einem violettbraunen Streif in den Seiten der Leibringe. Die Augen sind gelb.

"In Schöpf- und Ziehbrunnen. Bei Regensburg nicht selten."

"186. 21. Gammarus Pulex.

"G. cæsius, dorso fusco testaceus, segmentis posterioribus postice medio in dentem acutum productis.

"Koch Dtschl. Crust. Myr. u. Arachn. h. 36. n. 21.

"Fabr. syst. ent. II. p. 516. n. 7.

"Latr. gen. crust. et ins. 1. p. 58. n. 1.

"Cancer Pulex Linn. syst. nat. I. II. p. 1055. n. 81.

"Roes. III. p. 351. t. 62. f. 1–7.

"Grösser als Gamm. fossarum, 6 bis 7 Linien lang, von derselben Gestalt, doch an den scharfen

zahnartigen Spitzen des achten, neunten und zehnten Körperringes leicht zu erkennen, es ist nemlich der Hinterrand dieser Ringe in ein scharfes stachelartiges Zähnchen verlängert.

"Durchaus graubräunlich, platzweise gelblich durchscheinend, daher mit olivengrünlichen Anstriche; in den Seiten ein von innen durchscheinender Längstreif braun oder röthlich, auf dem Rücken vor der Spitze des 8, 9 und 10ten Ringes ein scharlachrothes Fleckchen, dergleichen rothe Querfleckchen in den Seiten der Ringe und kleinere an den Hüften der Beine.

"In grossen Wassergräben, auch in Weihern, gewöhnlich in grosser Anzahl."

"186. 22. GAMMARUS puteanus.

"Koch Dtschl. Crust. Myr. u. Arachn. h. 36. n. 22.

"In den Brunnen der Stadt Zweibrücken fand ich diese Species ziemlich häufig, ganz mit der im 138sten Hefte abgebildeten übereinstimmend, alle aber waren durchsichtig weiss, und nur der Darmgang ein wenig auf's Bräunliche ziehend; das vorletzte Glied der vier Vorderbeine schien weniger breit zu seyn. Wahrscheinlich ist das Abbleichen der Farbe zufällig und vielleicht Folge des Wassers, worin sie leben."

Boeck, who spells Koch's name as Kock, gives the following accounts of his works;—"Kock omtaler i 1844 i Deutschl. Crust. Myriapod. und Arach., H. XXXVI. *Gammarus putaneus*, som nu henfores til Slægten *Niphargus*." Here the date 1844 is inconsistent with that which he gives with the title. The specific name is also misprinted. The second account says;—"Kock sammenstiller i 1847 i 'Deutschlands Crustaceen, Myriapoden und Arachniden' de der fundne Amphipoder, nemlig: *Gammarus fossarum*, *G. pulex*, *G. puteanus* og desuden de nye Arter *G. medius* og *G. pilicornis*, hvilke han afbilder paa Pl. VII. Fig. 92–93." I regret that I have not been able to find out anything further about these last two species, or about the plate on which they are supposed to be figured, or indeed about the work in which they are reported to occur.

Leydig, 1878, points out that as the account of *Gammarus pulex minutus* by Gervais appeared in the same year (1835) with Koch's account of *Gammarus puteanus*, the honour of having first made known the well-shrimp must belong to Gervais and Koch in common. Koch's *Gammarus fossarum* is identified by Bate and Westwood with *Gammarus pulex*, Linn.; his *Gammarus pulex* appears to be Rösel's tooth-backed species, *Gammarus fluviatilis*.

1835. MILNE-EDWARDS, H.

Observations *sur les changemens de forme que divers Crustacés éprouvent dans le jeune âge*. (Lues à l'Académie des Sciences, le 27 mai 1833). Annales des sciences naturelles. Seconde Série. Tome troisième.—Zoologie. Paris, 1835. pp. 321–334.

After discussing the subject in regard to the Isopoda, from *Cymothoa* and *Anilocra* Milne-Edwards passes on to make the following remarks on the Amphipoda:—"Les CYAMES ou *poux de baleines* présentent aussi des différences considérables dans la forme de leur tronc et de leurs membres, suivant l'âge auquel on les examine, et ces différences rentrent encore dans la même catégorie que celles dont les Cymothoés nous ont fourni les premiers exemples.

"En effet, ce qui contribue le plus à donner aux Cyames adultes l'aspect si particulier qui les distingue, et les éloigner du type normal des Læmipodes, est l'aplatissement et la largueur considérable des segmens de leur thorax, la forme bizarre de leurs pattes et le grand

développement des vésicules fixées à la base des rudimens des membres thoraciques de la troisième et quatrième paires (Pl. 14, fig. 13). Les jeunes Cyames ont au contraire une forme svelte et élancée. Tous les segmens de leur thorax se ressemblent parfaitement entre eux, et représentent des tronçons d'un cylindre; leurs pattes sont grêles, cylindriques, et parfaitement extensibles; enfin les vésicules respiratoires ne sont pas plus développées que chez les Protons, les Chevrolles et les Amphipodes. (Voyez pl. 14, fig. 14).

"Il en résulte que les Cyames, lorsqu'ils viennent de naître, diffèrent bien moins des autres Crustacés du même groupe naturel que lorsqu'ils sont déjà parvenus à l'âge adulte. [[1]Ces observations ont été faites sur de très jeunes Cyames ovales (Roussel de Vauzème) extraits au moment même de la poche ovifère de leur mère; les différences ne peuvent donc être attribués à ce que les petits auraient appartenu à une espèce distincte comme quelques naturalistes à qui j'ai communiqué mes recherches semblent le penser].

"J'ai eu également l'occasion d'examiner quelques jeunes Phronimes. Les adultes, comme on le sait, se font remarquer par la grosseur démesurée de leur tête, par la forme presque conique de leur thorax, par le renflement de l'article basilaire des six premières fausses pattes abdominales, et surtout par le développement considérable des pattes thoraciques de la cinquième paire et par la grosse main didactyle qui termine ces membres, disposition dont les Amphipodes n'offrent pas un second exemple. (Voyez pl. 14, fig. 9). Dans les jeunes Phronimes, ces anomalies n'existent pas encore. La tête est de la grosseur ordinaire. Le thorax est presque aussi large en avant qu'en arrière, et se renfle par le milieu; l'article basilaire des fausses pattes abdominales est grêle et cylindrique; enfin les pattes thoraciques de la cinquième paire ne sont pas plus longues que les pattes voisines, et ne sont pas didactyles; on y remarque seulement un peu d'élargissement dans le pénultième article, sur le bord inférieur duquel le doigt mobile s'infléchit comme cela a lieu pour les pattes subchéliformes de toutes les Crevettines. (Voyez pl. 14, fig. 10)."

In his own "Amphitoé de Prevost," he notes the enlargement of the hand of the second gnathopod in the adult. In the young, the head is more voluminous than in the adult, and the lower antennæ, instead of being twice as long as the upper, are but little longer; "enfin les pattes mâchoires extérieures sont beaucoup moins élargies."

1835. Ross, James Clark.

Owen, Sir Richard, born 1804 (Hagen).

Appendix to the narrative of a second voyage in search of a North-West Passage, and of a residence in the Arctic regions during the years 1829, 1830, 1831, 1832, 1833. By Sir John Ross, C.B., &c., &c. Including the Reports of Commander, now Captain, James Clark Ross, R.N., &c., and the discovery of the Northern Magnetic Pole. London, 1835. (Amphipoda, pp. lxxxvi–xcii, partly by Owen.)

Guérin's *Themisto gaudichaudii*, from the Falkland Islands, is here recorded as occurring of greater size near the west coast of the Peninsula of Boothia, but it is, Boeck says, the *Gammarus* (*Themisto*) *libellula* of Mandt that is intended. The *Gammarus nugax* next mentioned is referred by Boeck to *Anonyx* (*Socarnes*) *vahli*, Kroyer. Among other already known species, *Talitrus edwardsii*, Sabine, is renamed *Amphithoe edwardsi*, being in fact *Oniscus aculeatus*, Lepechin, now called *Rhachotropis aculeatus*.

The new genus *Acanthonotus* (Owen, MS.), is thus defined:—"Antennæ subæquales, 4-articulatæ, articulo ultimo e plurimis segmentis efformato, articulo tertio superiorum brevissimo. Pedes 4-antici, monodactyli, filiformes, articulo ultimo primi paris serrato. Rostrum pro-

[1] Footnote.

ductum acutum, incurvatum. Oculi parvi." The type species, *Acanthonotus cristatus*, is described and figured. The generic name being preoccupied, is changed by Boeck to *Acanthonotozoma*.

The new genus *Acanthosoma* (Owen, MS.), is thus defined:—Antennæ inæquales, superiores dimidio breviores, articulo ultimo e plurimis segmentis efformato, articulis tertiis et secundis superiorum æqualibus. Pedes 4-antici, monodactyli, filiformes, articulo ultimo primi paris unguiculato. Rostrum productum acutum, undulatum. Oculi parvi."

This generic definition was sharply criticised by Kröyer, who transferred the type species, *Acanthosoma hystrix*, to *Amphithoë*. Bruzelius made it a species of his genus *Paramphithoë*. Boeck regards it as identical with *Oniscus cuspidatus*, Lepechin, and as Owen's generic name was preoccupied, he calls it *Acanthozone cuspidata*. E. J. Miers would retain it as a distinct species, *Acanthozone hystrix*, Owen. The *Acanthozone hystrix* of Buchholz is, I think, clearly a distinct species, as Miers points out, and may receive the name *Acanthozone buchholzi* in honour of its describer. Owen, in speaking of the rostrum of his species, says, "this part is white, curved over the head, and directed forwards." The description by Spence Bate, Brit. Mus. Catal., p. 147, corrects this statement, saying, "Cephalon furnished with a minute rostrum. First segment of the pereion having a large central dorsal tooth projecting upwards and forwards on the anterior margin." Buchholz supposes that Kröyer, Bruzelius, and Boeck, have only had young examples to examine, and would so account for the differences between their specimens and his, but Owen says expressly "Plate B, fig. 4, represents a large-sized specimen of the *Acanthosoma Hystrix*," so that to him, at least, Buchholz's argument will not apply.

1829–1844. GUÉRIN-MÉNEVILLE, F. E.

Iconographie du Règne Animal de G. Cuvier, ou représentation d'après nature de l'une des espèces les plus remarquables et souvent non encore figurées, de chaque genre d'animaux. Avec un texte descriptif mis au courant de la science. Ouvrage pouvant servir d'Atlas à tous les traités de zoologie. Par M. F. E. Guérin-Méneville. Tome II. Planches des Animaux invertébrés. Tome III. Texte explicatif. A Paris, 1829–1844.

[This work was published in *livraisons* between 1829 and 1844. The Plates containing Amphipoda probably all belong to the early part of 1836. An advertisement in the "Quarante-cinquième livraison. Crustacés. Pl. 35.," says, "La 46e et dernière livraison se composera du Texte descriptif de l'Iconographie et paraîtra fin mars 1838," but the promise was not, it appears, fulfilled till the end of 1843. The specific names, however, being given on the Plates, will carry the date 1836.]

In the third order of Crustacea, les Amphipodes "genre CREVETTE (GAMMARUS. Fab.)" stands alone, with various sub-genera. In the description of Pl. 25, fig. 4 is referred to *Phronima atlantica*, Guérin, 1836. Branchial vesicles are shown as attached to the third, fourth and fifth peræopods. The observation follows, "Nous avons une autre espèce, prise dans l'Océan qui baigne les côtes de l'Amérique, assez loin de l'embouchure de la Plata. Elle ressemble à la précédente, mais la main de la cinquième paire de pattes est beaucoup plus longue et plus grêle, peu renflée vers l'extrémité, avec la griffe simple, mais fortement renflée au milieu et une forte dent au côté interne de la pointe opposée de cette griffe. Cette troisième espèce a, comme on le voit, beaucoup de ressemblance avec la *Phr. sedentaria*, mais elle s'en distingue facilement par l'absence de dent au milieu interne du doigt mobile. Nous lui avons donné le nom de *Phronima solitaria*."

Fig. 5. is referred to "*Hyperia Latreillii*. Edw.", with the note that Straus described it under the generic name of *Hiella* (Mém. du Mus., t. xviii. pl. iv.).

Fig. 6. *Hyperia pedestris*, Guér., is thus described, "Très-distincte par la longueur de ses pattes et de son corps. Antennes inférieures un peu moins longues que les supérieures : celles-ci, moins longues que la tête. Pattes de longueurs très-inégales, grêles avec le premier article ou la hanche aussi mince que les articles suivants.—Hab. les côtes du Chili."

Fig. 7. is of "*Themisto Gaudichaudii* Guér.", the mandible of which is drawn with a four-jointed palp. Guérin adds a "*Nota*. M. Kroyer (Groenland amphipoder, p. 63, etc.,) a fat connaître deux autres espèces de ce genre curieux."

On Pl. 26, fig. 3 represents "Orchestia Fischerii, Edw." Fig. 4 is described by the words "Mandibules de l'*Orchestia gamarella*." The figure is very like Savigny's figure of the mandible of *Orchestia montagui*, and, like that, shows a rudimentary three-jointed palp. Fig. 5. is of *Talitrus platycheles*, Guér.; Fig. 6. of "*Atylus carinatus*. Leach."; Fig. 7. of "*Gammarus locusta*. Latr.," with the "*Nota*. Voir la description de plusieurs Gammarus d'Angleterre par M. Johnston (Zool. Journ., 1827, t. iii. p. 175)." Fig. 8 represents "*Leucothoe furina*, Savigny."; Fig. 9. "*Amphitoe filosa*. Savigny."

On Pl. 27, fig. 1 represents "*Corophium longicorne*. Fab. Latr (mâle)"; Fig. 2, "*Corophium longicorne*, F. (femelle)."; Fig. 3. "*Jassa pelagica*. Leach."; Fig. 4. "*Cerapus tubularis*. Say."; Fig. 5, "*Pterygocera arenaria*. Latr. Hab. les mers d'Europe (copie de Slabber)." Fig. 8. "*Typhis ferus*. Edw."; Fig. 9. "Le même, jeune."

Figures 1 and 2 Pl. 26, are of "*Ione thoracica*, Montagu," male and female.

Figures 6, 7, and 10 on Pl. 27, represent respectively "*Apseudes talpa*. Leach." "*Aceus forficularis*. Risso."; "*Praniza maculata*. Westw."

In the fourth order, Les Locmodipodes, "Genre CYAME (Cyamus. Latr.)" stands alone with three subgenera. On Pl. 28, fig. 1 represents "*Caprella tuberculata*. Guér.", "Hab. l'île de France."; the explanation of the figure being followed by the "*Nota*. Cette espèce est voisine des *Caprella acuminifera* et *scaura;* mais elle est bien distincte par sa tête courte, cornue, par ses antennes supérieures très-peu plus longues que les inférieures, et par les segments de son corps portant chacun un assez grand nombre de tubercules." Fig. 1*a*. "Sa queue vue en dessous," shows a pleon very clearly triarticulate, the terminal joint bearing a pair of wart-like limbs. These figures evidently represent the male sex, and are very different from the figure of "*Caprella tuberculata*, ♂," in Bate and Westwood, ii, 68, although to some extent resembling the figure they give for the female of that species, but still more resembling, except in regard to the frontal horn, the figure on page 63, which they name "*Caprella hystrix*," Kröyer. Fig. 2 is named "*Caprella lobata*. Latr. (*C. linearis?* Lin. Edw.), with the "*Nota*. M. Templeton (Trans. Ent. soc., vol. I, p. 191) a decrit et figuré plusieurs espèces de ce genre provenant de l'île Maurice." Fig. 3. is named "*Leptomera pedata*, Mull."; Fig. 4. is of "*Cyamus ovalis*. Roussel de Vauzème." Numerous details are given, with the acknowledgment, "(figures empruntées au travail de M. Roussel de Vauzème)" It would save some trouble if authors of systematic or general works on a subject would always acknowledge the sources from which their figures are borrowed. Fig. 5. is thus described:—Cyamus Delphinii, Guér. 5*a*. Le même vu en dessous. 5*b*. Appendice respiratoire et lame ovigère de la femelle.—Hab. Trouvé sur les parties génitales d'un Dauphin, sur les côtes des Antilles.

"*Nota*. Cette espèce est bien distincte de celles que M. Edwards mentionne, tant par ses formes que par son habitat. Elle est en ovale allongé ; ses segments thoraciques se touchent sur presque toute leur étendue, à l'exception des derniers qui sont un peu séparés sur les côtés. La grosse pince des secondes pattes porte au côté interne une fort dent saillante. Les filets branchiaux sont très-courts, inégaux et beaucoup moins longs que les pattes. Les premières articulations des pattes postérieures sont fortement dentées et de formes très-diverses."

1836. Guérin, F. E.

Description de quelques genres nouveaux de Crustacés appartenant à la famille des Hypérines. Magasin de Zoologie VI. 1836. Classe VII. Pl. 17, 18. 10 pages. (avril 1836). Classe VII. Pl. 19. 2 pages. (Mars 1836.)

After briefly reviewing the classification of the Hyperina in the various works of Latreille and Milne-Edwards, Guérin proceeds to define his new genus, *Primno*, as follows:—

"Corps alongé, de quatorze segmens, non compris la tête. Tête ovale, très bombée, perpendiculaire et terminée en pointe. Deux antennes plus longues que la tête, subulées, composées de deux articles, dont le premier court et le second effilé vers le bout, et n'étant pas articulé. Pieds de la première paire, les plus courts de tous, à article cylindrique, dépassant la tête de presque toute sa hauteur, et terminés par un petit ongle pointu. Seconds pieds un peu plus longs, avec le premier article large et aplati: les deuxième et troisième très courts, les quatrième et cinquième plus longs et égaux entre eux, et le cinquième terminé par un petit ongle pointu: troisième et quatrième pieds encore plus longs, simples, à articles cylindriques; cinquièmes pieds de plus du double plus grands que les précédens; le premier article grand, un peu aplati, presque aussi long que les pieds qui précèdent; le second court, armé d'une épine en arrière; le troisième également court, très étroit à la base, renflé en demi lune, et aigu à ses extrémités; quatrième article presque aussi grand que le premier, large et aplati, armé de fortes épines à son côté antérieur; cinquième, grêle, plus long que le quatrième, cylindrique, et un peu courbé, terminé par un ongle assez long, très aigu et un peu courbé; sixièmes pieds beaucoup plus courts, à premier article large et plat; deuxième court, inerme; troisième deux fois plus long; quatrième aussi long que le premier, étroit et armé d'épines en avant; cinquième aussi long que le précédent et terminé par un ongle aigu; septièmes pattes encore plus courtes; à premier article large et aplati, ayant les autres articles cylindriques et grêles, et la griffe du dernier renflée et arrondie, au lieu d'être aiguë comme aux autres pattes. Trois premiers segmens de l'abdomen grands et arrondis en arrière, portant chacun une paire de pattes natatoires conformées comme dans les Phronèmes; les suivants courts, plus étroits, et donnant attache à des lames natatoires simples, larges, un peu lobées au bout, mais n'étant point terminées par deux petits appendices comme dans les Phonimes.

"Comme on le voit par ces caractères, ce genre est très voisin des Phronimes, et doit être placé immédiatement après ces Crustacés."

The type species, *Primno macropa* is figured. The derivation of the oddly formed specific name is indicated by the French name "*P. à grands pieds.*"

The new genus *Hieraconyx* is next described:—"Corps court et ramassé, composé de treize segmens non compris la tête. Tête ovale, très grosse, perpendiculaire, occupée en entier par les yeux; quatre antennes inégales; les supérieures de la longueur de la tête, cachées dans une fossette; les inférieures un peu plus longues; ces quatre antennes composées d'un support plus épais, court, et d'une tige multiarticulée. Premier et second segments du thorax réunis, et portant les deux premières paires de pattes; les deux segments qui suivent égaux entre eux et plus étroits que le premier ou les deux premiers, soudés; cinquième segment plus large et dilaté en arrière et en bas; les deux derniers étroits, cachés en bas par la dilatation du cinquième; pieds des deux premières paires assez courts, simples, égaux entre eux, à articles peu aplatis, troisièmes et quatrièmes terminés par une petite main imparfaitement didactyle, ayant le doigt mobile formée du cinquième article et de l'ongle aigu qui le termine; cinquièmes pieds les plus grands de tous, ayant le premier article très large et aplati, les deux suivants courts et transversaux; le quatrième grand, épais, denté au côté antérieur; le cinquième de la longueur du précedent, cylindrique et terminé par un ongle

assez grand, aigu et un peu courbé; sixièmes pieds plus courts, à premier article aplati, les deux suivants petits, le quatrième renflé, inerme; pieds de la septième paire encore plus courts, ayant le premier article grand, plat, et les suivants cylindriques, moins longs ensemble que le premier, recourbés et cachés sous celui-ci dans le repos; les trois premiers segments de l'abdomen grands, diminuant de grandeur, portant chacun une paire d'appendices natatoires, semblable à ceux des autres genres de la même famille; les trois segmens suivants courts, portant chacun une paire de lames plates, ovales, un peu échancrées au bout, mais d'une seule pièce, comme dans le genre précédent." Guérin considers that this genus comes very near his other genus *Themisto*. He figures the type species *Hieraconyx abbreviatus*, which Spence Bate gives as *Anchylomera abbreviata*, regarding the genus *Hieraconyx* as representing the male form of Milne-Edwards' *Anchylomera*.

The new genus *Pronoë* is thus described:—Corps alongé, étroit, composé de quatorze segments, en n'y comprenant pas la tête. Tête grande, occupée par les yeux, arrondie, avancée, ayant le front tres bossu, creusé devant pour recevoir les antennes supérieures, avec le tubercule buccal peu saillant. Antennes plus courtes que la tête, plates, paraissant composées de trois articles, dont les deux premiers très courts. Antennes inférieures insérées près de la bouche grêles, cylindriques, sétacées et formées de cinq articles se reployant l'un sur l'autre. Pattes simples et monodactyles, allant en augmentant de longueur depuis les premières jusqu'aux cinquièmes; les quatre premières paires ayant tous leurs articles cylindriques; premier article des trois dernières paires large, aplati et arrondi; sixième paire beaucoup plus courte; septième, composée seulement du premier article et d'un petit tubercule qui semble le rudiment des autres. Les trois premiers segments abdominaux grands, arrondis et portant chacun une paire d'appendices natatoires, conformes comme dans les autres genres. Les trois segments suivants ayant des appendices étroits, plats, alongés et terminés par deux petites lames arrondies au bout; le dernier segment court et triangulaire."

Guérin at first thought that his *Pronoë* was the young of *Typhis*, to which it comes very near, especially in regard to the antennæ, but he found that it differed markedly in regard to the gnathopods. He figures the type species, *Pronoë capito*. He also figures and describes in detail his *Phronima atlantica*, which Claus considers to be the immature female form of *Phronima sedentaria*, but which Streets upholds as a distinct species. He figures and describes as a new species *Oxycephalus oceanicus*, though somewhat doubtfully separating it from "*Oxycephalus piscatorius*," Milne-Edwards, of which species Claus decides that it is the young male.

The new genus *Phlias* is thus described:—"Corps court, comprimé latéralement, composé de quatorze segments, non compris la tête; tête petite, en grande partie cachée dans le premier segment. Yeux saillants. Antennes supérieures grandes, ayant un pédoncule renflé et composé de trois articles (la tige est détruite, et il n'en reste que la base. On voit qu'il n'y avait pas de petit filet supérieur comme dans les crevettes). Antennes inférieures tres petites, insérées sous les précédentes, composées de deux articles égaux et d'une courte tige multi-articulée. Quatorze paires de pattes filiformes; simples, monodactyles; les quatre premières paires égales entre elles, plus courtes que les trois dernières, qui sont aussi égales entre elles. Appendices natatoires des trois premiers segments de l'abdomen de forme ordinaire; ceux du quatrième un peu plus petits, mais encore semblables, c'est à dire terminés par deux lames plus longues que la tige qui les supporte, ciliées; ceux du quatrième [cinquième] sont composés d'une tige plate, terminée par deux petites lames ovalaires et plus courtes, enfin ceux de l'avant-dernier segment ont leur tige plus courte, large et arrondie, et terminée par deux petites lames ovales et un peu pointues. Dernier segment abdominal très court, transversal et un peu arrondi." Of the type species *Phlias serratus*, which is figured, pl. 19, figs. 1–4, he gives the following account, "ce petit Crustacé est long de cinq a six millimètres; tous les segments de son corps ont leur tranche supérieure très saillante, ce

qui le rend fortement dentelé quand on le voit de profil; il est d'un jaune brun opaque. M. Gaudichaud a trouvé cette jolie petite espèce pendant la traversée des îles Malouines au Port Jakson." Guérin's figures should be compared with those of *Iridium* by Grube, and of *Pereionotus* by Bate and Westwood.

1836. Templeton, Robert.

Catalogue of Irish Crustàcea Myriápoda, and Arachnöida, selected from the Papers of the late John Templeton, Esq. By Robert Templeton, Esq. The Magazine of Natural History, and Journal of Zoology, Botany, Geology, and Mineralogy. Conducted by J. C. Loudon. Vol. IX. London, 1836. Art. III. p. 12.

Under Malacostraca is included the following notice:—"EDRIOPHTHÁLMA, *Gammáridæ*. Tálitrus *Latr.*, Locústa *Latr.* Inhabits all our sandy shores.—Orchéstia *Leach* littòrea *Mont.* Inhabits all our sandy shores, living under stones and *Fùci*, and, when disturbed, leaping to a considerable distance.—*Gámmarus Latr. Pùlex Linn.* aquáticus *Leach.* Inhabiting our rivers and springs.—*G. Locusta Mont.* Inhabits the sea along our coasts, never voluntarily leaving the water.—*Corò*phium *Latr.* grössipes *Linn.*, longicorne *Latr.* Leach. Inhabits Belfast Lough. In the little pools of salt water at the point fields Belfast." The remaining Edriophthalma mentioned are Isopods.

1836. Templeton, Robert.

Descriptions of some undescribed exotic Crustacea. (Read 1st June, 1835.) The Transactions of the Entomological Society of London. Vol. I. London, 1836. Part III. pp. 185–194.

The *Crustacea* in question were "picked up either at Mauritius or on the way thither." He first describes:—

"Anisopus dubius. Pl. XX. fig. 1. Greenish, dotted over with reddish-brown specks. Head large, subquadrangular, carrying 4 antennæ, the superior nearly as long as the body, and exceeding in length by about one-fifth part the inferior; the 1st joint is minute, the 2nd large and thick, the 3rd elongate, nearly cylindric, and wanting the little process which characterizes the true *Gammari*, 4th joint multiarticulate, tapering. The inferior antenna has the 2nd and 3rd joints, subequal, much longer than any of those of the superior, and the remaining similar, but of smaller dimensions. Both antennæ are spiny or hairy. The thoracic rings are narrow, and extend inferiorly into plates concealing the upper part of the 5 anterior pairs of legs. Those of the abdomen are much larger and end in a 4-articulated tail, with a jointed stylet on each side proceeding from the inferior posterior angle of the ultimate and penultimate articulations. The first pair of legs is extremely minute and terminates in a simple claw, the 2nd much longer, as are the 3 succeeding pairs, and terminates in joints slightly dilated, the last carrying a tolerably strong curved claw. The 3rd pair has the last joint very much dilated, subtriangular, not toothed, but bearing a very strong curved claw; the posterior edge is waved and hairy. The 2 succeeding pairs of legs resemble the 1st pair except in their greater size; but the 6th and 7th pairs, of nearly equal dimensions, exceed all the anterior legs in being both much longer and much more robust, and besides differ in having the coxæ very much dilated, and the last joint of each

leg elavated, surmounted by two blunt teeth, and a large dentated curved claw directed forwards. Immediately behind these legs arises, from the inferior part of each joint, the bifurcate articulated appendages which are called fin-feet; so that all the rings of the body have either true or fin feet or styles articulated to them, in this respect differing from all hitherto noticed genera.

"This species swims with considerable rapidity and has all the habits of our common European marine *Gammari*. Its size is about $\frac{1}{6}$th of an inch, and its colour subject to but little variety, being of a greenish tint more or less brownish in the specimens I have examined. In its generic characters the great and disproportionate length of the 2 last pairs of feet, the fin-feet arising from the succeeding joints, and the appearance presented by the antennæ, which are much longer than in the contiguous genera, at once distinguish it. The claws also offer distinctions."

In the above description, Templeton speaks of a minute first joint to the upper antennæ, which he very properly does not figure. He speaks of the lower antennæ having joints *much* longer than any of those of the superior, and again his figure contradicts his description. By the extremely minute "first pair of legs" he evidently means the maxillipeds, what he calls the second and third pairs being the two pairs of gnathopods. The third peræopods are missing both from the figure and the description. It is curious that Templeton should have thought his genus distinguished by having appendages to all the rings of the body, since few genera of Amphipods are without this characteristic, unless the telson be counted as one of the rings. Milne-Edwards introduced the genus between *Iæa* and *Amphitoe*, adopting Templeton's error as to the gnathopods, and not noticing his other mistakes, unless obliquely in the words, "l'abdomen ne paraît offrir rien de particulier." Spence Bate, in the Brit. Mus. Catal., p. 245 (*Anisopus dubius*, p. 145, by error in the index), describes Templeton's species as *Amphithoë dubia*, adding that "this description is taken from Templeton's figure, which is not well drawn," and that "if the telson (which is neither figured nor described) should be found to be formed into a hook, then it belongs to *Sunamphithoë*." As a matter of fact, fig. 7, on Plate XLII, of the Catalogue does not fairly represent Templeton's figure, and since the generic distinction which separates *Sunamphithoë* from *Amphithoë* is no longer the hooked telson, but the distal widening of the fifth joint in the hinder peræopods, which Templeton expressly describes and very clearly figures, the name *Anisopus* would have priority over *Sunamphithoë*, had it not been preoccupied among the Decapod Crustacea by de Haan, and also among Coleoptera, in 1835. The species itself is probably the same as *Sunamphitoë hamulus*, Sp. Bate, 1856, but I do not think that for such a negation of a name as *dubius*, any alteration should be made in the commonly received nomenclature. In the figure the last uropods show the terminal hooks which are characteristic of the Amphithoinæ.

The next species is described as follows:—

"Thaumalea depilis. Plate XX. fig. 2. *Erythrocephalus melanophthalmus?* Tilesius, Neue Ann. Wetterausch. i. p. 6. pl. xxi. *a*. fig. 5.

"Body hyaline, with a few dark specks, especially along the edges of the abdominal plates or rings. The head is quadrangular, not large; the eyes deeply imbedded in it; front retracted inferiorly, from about its middle arise the superior antennæ, which are short and tumid; 1st joints short, forming together a truncated cone on which rests the elongate spindle-shaped 4th joint. The inferior antennæ arise from the inferior part of the frontal surface; they are much smaller than the superior, composed of 4 joints, of which the 1st is small and obconic, the remainder in length subequal, the last conic. The body swells out to about the 5th ring, when it again becomes gradually reduced in size and ends in a bifurcate articulated tail. There are only 6 legs apparent, the 2 first pairs being very short and apparently without claws, the 4 posterior pairs of about equal length, tapering, and with

slender slightly curved claws. From the abdominal joints proceed bifurcate articulated appendages, but, as well as the whole animal, apparently devoid of hairs.

"This minute species swims but badly, having none of the celerity of motion so conspicuous among the *Gammari*, to which it bears resemblance in its form. It differs from every genus I am acquainted with, in the antennæ, in the relative dimensions of the legs, the elongate and undilated form of the tarsal joints, and in the claws. I confess my inability to allot it to its proper place among the minute *Crustacea*, the differences being in fact more conspicuous than qualities by which its affinities to any one genus can be traced. It was found off Port Natal, in the summer of 1835, in lat. 37° S. and 21° E., while I was searching for *Zoeæ* in the sea-water. It is about $\frac{1}{20}$th of an inch in length."

In 1838 Milne-Edwards suggested that this species might belong to his genus *Vibilia*. In the Hist. des Crust., 1840, he leaves it unnoticed. Spence Bate, Brit. Mus. Catal., p. 304, calls it *Vibilia depilis*, remarking that he has little doubt that Templeton's "figure is an imperfect representation of *Vibilia*, and probably the young of some known species."

The next Amphipod described is:—

"Cerapus (*Say*) abditus. Plate XX. fig. 5."

Templeton does not happen to include in the description and figures any of the distinctive marks on which S. I. Smith has founded his subfamily Cerapinæ with its single genus *Cerapus*, Say. In extracting his specimen from its tube, he seems to have left three pairs of the peræopods in the tube, and to have forced back one pair to an apparent attachment with the second segment of the pleon. There is, however, no reason for withdrawing the species from the genus *Cerapus*, Say, in which Templeton has placed it, its transfer to *Cerapodina* by Milne-Edwards having been based on obvious errors in the original description, and an undue importance attached to the number of articulations in the antennary flagella. Templeton's remarks appended to his description of the animal are worth quoting. "The entire animal is about $\frac{1}{8}$th of an inch long, exclusive of the antennæ, and it presents some peculiarities, with one exception, unique in this family. It has formed for itself or seized upon a little membranous tube, nearly $\frac{1}{5}$th of an inch long, which does not resemble the case of *Tubularia*, but seems composed of a series of rings, and resembles in texture the papyritious covering of the pendulous wasps'-nests. It is perfectly cylindrical, of a brown colour, and opake. When disturbed, the little animal retires within this tube, the tips of the antennæ alone appearing, with which it continues to investigate its neighbourhood; and whenever the feeling of perfect security prevails, it comes out as far as the second or third ring from the head, the antennæ being perpetually in motion, extended to the right or left, or as if lashing the objects about it. When it wishes to change its place it seizes with its claws the little fragments of sea-weed about it, and dragging, urges itself forward. I have never seen it dash itself through the water by any mode similar to that of the *Gammari*; and I should infer that the tube was its natural place of residence from the want of legs or fin-feet at the middle rings, in which it differs from *C. tubularis* of Say, that author figuring a regular succession of both. I have observed the tail slightly protruded, and the members which are sketched as attached to adjoining rings used as feelers. While watching it, which I did for some hours, I was exceedingly surprized and amused to find it disappearing from one end of the tube, and reappearing like magic at the other, having doubled itself up towards its belly in the passage, but with such quickness, considering the narrow calibre of its mansion, that I could hardly credit my eyes but that it had two heads, and indeed, a gentleman who was in the pavilion with me at the time could not be persuaded to the contrary. The animal, however, scarcely remained a second at this extremity, but shot back to the one it had formerly occupied; and during the time I watched it I never saw it remain permanently at it, or rather I should say for a longer period than a second, or a second and a half at furthest. The maxillæ resemble those of *Scolopendra*, but are very

minute, and I believe the smaller palpi arise from them or a very closely adjoining part, but vision is so indistinct in so small an object as to make me hesitate in affirming this. The circulation of the blood was distinctly visible in the antennæ, and the globules, unlike those I had hitherto examined, were rotund, and of comparatively large dimensions. From the upper part of the head a spine, with a very dilated base, extends forwards to between the roots of the superior antennæ. The eyes were black, with a pale encircling ring. The head brown, dotted with white, especially behind; and the antennæ pale, annulated imperfectly with reddish brown."

Templeton further describes "CAPRELLA (Lam.) SCAURA. Plate XX. fig. 6." and "CAPRELLA (Lam.) NODOSA. Plate XXI. fig. 7."

Caprella scaura, from Mauritius, in Mayer's opinion perhaps includes *Caprella attenuata*, Dana, and undoubtedly includes *Caprella nodosa*, also from Mauritius, *Caprella attenuata* being the male, *Caprella nodosa* the form of the female and young. Spence Bate, Brit. Mus. Catal., pp. 355, 357, gives the length of both forms as half an inch, whereas the original from which he is quoting gives for the length of *Caprella scaura*, "from the tips of the antennæ to the claw of the hind leg," about one inch, and states that *Caprella nodosa* "is about $\frac{1}{8}$th of an inch long."

1837. BENNETT, FREDERICK DEBELL.

On the Natural History of the Spermaceti *Whale*. Proceedings of the Zoological Society of London. Part V. 1837.

The account of this paper says, p. 12, "it appears that the sperm *Whale* is not like the *Balæna mysticetus*, constantly found with *Barnacles* and other parasites adhering to its skin, a circumstance accounted for by Mr Bennett from the former species inhabiting deep water, while the latter frequents soundings, and is also much more sluggish in its movements. One species of *Barnacle*, the *Otion Cuvieri*, is sometimes found attached in a single cluster to the lips or lower jaw of the *Cachalot*, and a few small *Onisci* occasionally adhere to the skin; in its blubber also numerous cysts of a species of *Cysticercus* are met with." Lutken considers that the *Onisci* here mentioned are probably *Cyami*.

1837. BURMEISTER, HERMANN.

Handbuch der Naturgeschichte. Zum Gebrauch bei Vorlesungen entworfen von Hermann Burmeister. Zweite Abtheilung. Zoologie. Berlin. 1837.

Burmeister's first principal group in the Animal Kingdom contains the Gastrozoa with four Classes. The second group consists of the Arthrozoa, beginning with Class five, Vermes. Class six, the Crustacea, is divided into the following orders, Pseudocephala, Aspidostraca, Thoracostraca, Arthrostraca. The Arthrostraca, comprising the Amphipoda and Isopoda, are thus defined, p. 567:—

"Vierte Ordnung. Arthrostraca. Malacostraca edriophthalma, *Leach*. Der Kopf ist frei abgesondert, trägt 2 Paar Fühler, die äusseren ohne Schuppe am Grunde, 1 Paar ungestielter zusammengesetzter Augen mit fazettirter Hornhaut, seltener 2–4 einfache Augen, 1 Paar Kiefer und 3 Paare accessorischer Mundtheile. Brustkasten gegliedert, 4–7 ringelig, jeder Ring mit 1 Paar einfacher, selten scheerenförmiger Füsse. Hinterleib 1-, 3–6 gliedrig, oder fehlt ganz, im letzteren Falle ohne, gewöhnlich mit Flossen am Ende und Flossenfüssen an seiner Unterfläche. Die Jungen haben die Form der Alten, doch öfters fehlt ihnen das

letzte Fusspaar, welches sich jedoch bald entwickelt; die Weibchen tragen die Eier an der Brust unter Schuppen, bis die Jungen ausgekrochen sind, ja selbst diese bestehen darin ihre Ausbildung, bis das letzte Fusspaar fertig ist."

In defining the "Flohkrebse. Amphipoda," he says "die Kiefer gewöhnlich mit einem 3gliedrigen Taster." He makes of them two divisions:—"A. Mit grossem 6gliedrigem Hinterleibe, woran die aus den letzten Flossenfüssen gebildete 5lappige Schwanzflosse," containing the two families *Gammarina* and *Hyperina*, and "B. Mit verkümmerten Hinterleibe und einfachen Augen," containing the two families, *Læmodipoda* and *Pycnogonidæ*. Kroyer finds much fault with him for including the second subdivision in the Amphipoda, but with regard to the Læmodipoda Burmeister's view has prevailed. His name *Arthrostraca* has been adopted by authors of eminence for the group to which he applied it. His arrangement of the first two families is as follows:—

"Fam. Gammarina. Das letzte Paar der accessorischen Mundtheile bedeckt die vorhergehenden völlig und schiesst den Mund; der Kopf ist klein, aber die Fühler sind lang. Alle schwimmen behende, vorzüglich durch Schlagen des Hinterleibes und seiner Flossen.

"*a.* Saltatoria. Leib stark seitlich zusammen gedrückt; die vier ersten Fusspaare stehen nach vorn, und werden von einer Platte ihrer Ringe am Grunde bedeckt; Hinterleib gebogen. Alle haben 4 Fühler.

"*α.* Kiefer ohne Taster, innere Fühler kürzer als die äusseren.

"Gatt.: *Talitrus, Orchestia* (2tes Fusspaar gross zum Rauben geschickt. *O. littoralis*, Nordsee).

"*β.* Kiefer mit Taster, innere Fühler länger als die äusseren.

"*αα.* 2 Vorderfüsse ohne Auszeichnung.

"Gatt.: *Lysianassa, Dexamine.*

"*ββ.* 2 Vorderste Fusspaare sind Raubfüsse.

"Gatt.: *Gammarus* (2 Geissel am inneren Fühler. *G. pulex*, in allen Gräben). *Amphithoë* (nur 1 Geissel ebenda).

"*γγ.* 2 vorderste Füsse scheerenförmig. Gatt.: *Leucothea.*

"*b.* Ambulatoria. Leib flachrund, die 4 ersten Brustringe ohne Seitenplatten, daher die Füsse bis zum Grunde frei sind. Hinterleib grade. Augen klein, oft kaum zu bemerken.

"*a.* Untere oder äussere Fühler lang, fadenförmig.

"Gatt.: *Erichthonius* (2tes Fusspaar Scheeren). *Atylus.*

"*β.* Dieselben Fühler sind fuss-förmig und haben statt der Geissel ein einfaches Glied.

"*αα.* Zwei Geissel an den oberen inneren Fühlern.

"Gatt.: *Unciola.*

"*ββ.* Eine Geissel am oberen Fühlerpaar.

"Gatt.: *Cerapus, Podocerus* (mit Raubfüssen am 2ten Paar), *Corophium* (ohne Raubfüsse).

"Fam. Hyperina. Das letzte Paar der accessorischen Mundtheile bedeckt die vorhergehenden nur wenig und lässt den Mund frei. Kopf gross, dick, mit kleinen Fühlern aber sehr grossen Augen. Keine Seitenschilder an den ersten Brustringen. Sie sind grösstentheils Schmarotzer an Fischen.

"*a.* Alle vier Fühler an der Stirn eingelenkt.

"*α.* Die 3 letzten Fusspaare gleichförmig, zum Rudern geschickt.

"Die Gatt. *Vibilia, Hyperia* (*Hiella* Strauss), *Phoreus, Lestrigonus* haben 2 Paar Fühler; die Gatt. *Daira* nur ein. Bei allen 5 sind die Füsse des 3ten und 4ten Paares von gewöhnlicher Bildung, aber bei *Themisto* sind sie Raubfüsse.

"*β.* Manche der 3 letzten Fusspaare sind Scheeren.

"Die Gatt. *Dactylocera* und *Anchylomera* haben schildförmige Grundglieder an den 3 hinteren Fusspaaren, und die erste am sechsten eine Scheere; die Gatt. *Phronima* hat am 5ten eine Scheere, keine unteren Fühler und keine schildförmigen Grundglieder.

"*b.* Das untere Fühler paar sitzt an der hinteren Seite des Kopfes und ist geknickt.

"Mit langem glattem Kopf: Gatt. *Oxycephalus*; mit kurzem dickem: *Typhis* (erstes Glied des 5ten und 6ten Fusspaares gross, schildförmig, nach vorn gerichtet)."

In defining the Læmodipoda, he assigned them "2 einfachen Augen," "Kiefer ohne Taster," and says "Hinterleib fehlt, oder Igliedrig." He briefly arranges them thus:—

"*a.* Leib flach gedrückt, mit grossen Krallenfüssen, wovon das 3te und 4te Paar in wurstförmige Kiemenblasen verändert sind.

"Gatt. *Cyamus* (*C. ceti*, Walfischlaus. Ann. des scienc. natur. sec. sér. T. 1. p. 239 seq.).

"*b.* Leib lang gestreckt, linienförmig; Beine schlank, dünn, gleichförmig; obere Fühler mit Geissel.

"Gatt.: *Caprella*, *Proton*, *Leptomera*."

The Pycnogonidæ follow, with *Nymphon grossipes* and *Pycnogonum balænarum*.

1837. Rathke, Martin Heinrich, born 1793, died 1860 (Hagen).

Zur Morphologie, Reisebemerkungen aus Taurien. Riga u. Leipzig, 1837. 5 pl. Dritte Abhandlung. Zur Entwickelungsgeschichte der Crustaceen.

This includes references to *Amphithoë* and *Gammarus* (Faxon).

1837. Rathke, M. H.

Beitrag zur Fauna der Krym. Mémoires présentés a l'Académie Impériale des Sciences de St Petersbourg par divers Savans. Tom. iii. 1837. pp. 371–380. Pl. V.

Rathke here describes and partially figures a species under the name of *Orchestia littorea*, which Spence Bate identifies with *Orchestia mediterranea*, Costa, but Rathke himself in a note refers to pl. 11, fig. 7 of Savigny's Descript. de l'Egypte, as giving a capital representation of his species. But this *Orchestia montagui* is identified by Spence Bate with *Orchestia littorea*, Montagu. A comparison of Rathke's figure with Savigny's makes it tolerably clear that Rathke did not commit an error in his Note, and since Savigny's species cannot be *Orchestia mediterranea* and by its long sloping palm and the comparatively short final joint to the shaft of the lower antennæ is possibly quite distinct from *Orchestia littorea*, it will be best to retain *Orchestia montagui*, Savigny, and refer Rathke's *Orchestia littorea* to it. His *Gammarus gracilis* is identified by Spence Bate and Boeck with *Gammarus marinus*, Leach. The name of his new genus *Amathia* being pre-occupied was altered by Bate and Westwood to *Amathilla*. He thus defines it:—"Thorax subcylindraceus, abdomen compressum. Antennæ quatuor inæquales; superiores inferioribus paulo breviores, earum quævis ex articulis tribus atque flagello composita; superiores cum ramo parvo accessorio juxta flagelli basin. Oculi magni, reniformes. Pedes quatuordecim; duo eorum paria antica chelis monodactylis complanatioribus, subæqualibus. Stylorum abdominalium paria tria. Abdominis appendicula terminalis simplex, erecta, lamelliformis."

His new species *Amathia carinata*, Bate and Westwood say, "from his description and figure, agrees so closely with *A. Sabinii* of Leach, that we should certainly have considered them as identical had not Rathke (1843) stated that they were distinct." An author's statement, however, in defence of his own species need not be taken as invariably conclusive.

The new genus *Hyale* is defined as follows:—"Corpus elongatum compressum. Antennæ inferiores superioribus aliquantulum longiores: earum quælibet e tribus articulis atque

flagello composita. Oculi disciformes. Pedes quatuordecim: duo eorum paria antica chelis monodactylis complanatis, secundi paris multo majoribus. Stylorum abdominalium paria tria. Abdominis appendicula terminalis simplex, erecta verruciformis."

On this genus Spence Bate, B. M. Catal., p. 87, remarks, "Dana has arranged this genus in his subfamily Lysianassinæ. Not having seen a specimen, I adopt the same arrangement; but judging from the figure of the author, I should be inclined to classify it near to *Nicea* of Nicolet, from which the female appears to differ only in the posterior pair of pleopoda having two branches—a feature that the author has not alluded to in the description of the animal, although exhibited in the figure. It is this character, together with the absence of any mention whether the mandibles are furnished with an appendage or not, that has precluded my placing it among the Orchestidæ."

Axel Boeck in 1870 united *Allorchestes*, Dana, and *Nicea*, Nicolet, as synonyms to *Hyale*, Rathke. In this identification I myself (1876) and Wrześniowski (1879) have agreed with him. Faxon, Crustacea of the Lake Titicaca, 1876, takes a different view, which, to make the subject intelligible, must be given in full. The genus *Allorchestes*, he says, "differs from *Nicea*, Nicolet (as limited by Bate and Heller) in having the telson single instead of double or cleft. The fourth segment of the palpus of the maxillipeds is well developed, as in *Nicea* and *Gammarus*, and, as in these genera, is commonly unguiculiferous. Neither Dana, in describing *Allorchestes*, nor Nicolet, in his description of *Nicea* (published in the same year), mentioned the form of the telson. The two names were therefore synonymes. Bate, in a list of British *Amphipoda*, published in 1856 in the Report of the British Association for the Advancement of Science, indicates, without describing, two genera, *Allorchestes*, Dana, and *Galanthis*, gen. nov., which, as appears from his subsequent description, were based upon the trivial character of a different length of the first and second antennæ, and a *differently formed telson*, Dana's name, *Allorchestes*, being restricted to those species in which the first antennæ are (at least) as long as the peduncle of the second antennæ and the telson entire, and his own name *Galanthis* including the species with the two pairs of antennæ subequal and short, and the telson cleft or double. In 1861 he suppressed the name *Galanthis* in favor of Nicolet's *Nicea*. The proportion of the antennæ and the form of the telson brought together by Bate in his generic diagnoses are not in reality always concomitant, and Heller for the first time properly distinguished the two genera by the character of the telson alone. Grube (1866) adopts the relative length of the two pairs of antennæ (at most a specific character) as the generic distinction. All his species of *Allorchestes* have a double telson, and should be transferred to *Nicea*.

"Boeck (1872) apparently misled by the fact that Bate carelessly describes *Nicea Nilssonii* with an entire telson, and places it under *Allorchestes* §, would unite the two genera, giving as a generic character '*appendix caudalis brevis, crassa et fissa.*' He furthermore considers both *Allorchestes* and *Nicea* synonymous with Rathke's older *Hyale*, the type of which, *H. pontica*, was carefully described and figured with the posterior caudal stylets two-branched. Boeck has not had access to Rathke's type, as far as I can learn; but in a specimen from the Mediterranean 'which is doubtless Rathke's species,' he finds the last pair of saltatory appendages one-branched. This assumption of identity, it seems to me, cannot outweigh the careful description and illustration of the founder of the genus, unless confirmed by examination of the type of *Hyale Pontica*.

"In 1874 Professor S. I. Smith described a new amphipodous genus, *Hyalella*, from the fresh waters of the United States, differing from '*Hyale*' in having a styliform fifth segment to the palpus of the maxillipeds and an entire telson. The so-called fifth segment may perhaps be more correctly regarded as a movable spine, like those seen both lateral and terminal on the caudal stylets, or like the *unguis* which tips the dactylopodite of the thoracic legs. However this may be, it is quite as well developed in several species of

'*Hyale*' (*Nicea*), and is not therefore a generic character. *Hyalella* is then a synonyme of *Allorchestes*."

To the second paragraph of this quotation is appended this note: "§ Doubtless a large number of the species placed under *Allorchestes* by Bate in his Catalogue of the *Amphipoda* in the British Museum have in reality a divided telson. In fact, it would seem that the telson is cleft in *most* of the marine forms, and such probably formed the bulk of Dana's original genus *Allorchestes*. The only types of Dana's species that I can discover are two specimens of *A. media* in the Museum of Comparative Zoölogy. In these the telson is cleft to the base. This, however, will not affect the synonymy as given above."

There are, however, some considerations which Mr. Faxon does not appear to have taken into account. He says that *Hyale pontica* was carefully described and figured with the posterior caudal stylets two-branched (zur Fauna der Krym, p. 87, pl. v. figs. 20-28, 1836), but no allusion to this feature is made in the generic character by Rathke (though Spence Bate introduces it in his Catalogue), and in the description of the species Rathke's words are:— "die Sprungbeine sind nur kurz und schwach; das erste Paar ist am längsten, jedoch kürzer als das hinterste Paar der Afterbeine, das zweite ist noch kürzer, und das letzte am kleinsten: an den beiden ersteren Paaren sind die Aeste ungefahr so lang, als die Wurzelglieder, an den letzten aber bilden die Aeste nur zwei sehr kleine warzenförmige Vorsprünge des Wurzelgliedes." Here we find that in the first and second uropods the rami are about as long as the peduncles (not much shorter as the B. M. Catalogue makes out), but on the last pair the rami form only two very small wart-like processes of the peduncle. Possibly this means *only two to each peduncle*, but I think that it more probably means *only two* for the pair of peduncles. It is true that on Pl. v., Fig. 21, representing "das hinterste Sprungbein," shows two rami to one peduncle, but this plate is signed "W. Pape del.," not as on other plates in the same memoir, "Rathke del." This takes something from the force of Mr. Faxon's expression, "the careful description and illustration of the founder of the genus." Nevertheless with only these facts in view I should accept Mr. Faxon's ruling. But in his later work, B. z. Fauna Norwegens, pp. 81–83, Rathke describes, under the name "*Amphithoë Prevostii*, M. Edwards?," a species of which he says "the pleopoda of the sixth pair are very small, and do not end with two rami, but each consists only of two joints, tolerably thick in proportion to their length, of which the terminal joint is smaller than the basal, and bears at the end some small spines. The back is quite smooth throughout." He further says, "this animal is very nearly related to an Amphipod which I found in the Black Sea and described under the name *Hyale Pontica*, but is distinguished from it chiefly by the want of a telson." At the end of his book, p. 264*e*, he has made up his mind that the species is new and names it *Amphithoë nilssonii*. He thought it a question (p. 83) whether this species and *Hyale pontica* ought not to form a new genus, on the ground that the second gnathopods were so different from those of the Amphithoë species as then accepted. His ascribing to *Amphithoë nilssonii* the want of a telson was of course due only to an oversight or an accidental defect in his specimen, but he says nothing of distinguishing it from *Hyale pontica* by the difference of the last uropods. *Amphithoë nilssonii* is transferred by Spence Bate to the genus *Allorchestes*, while *Amphitoë Prevostii* of Milne-Edwards he assigns to *Nicea*, although when he saw the type specimen he considered it "synonymous with *Nilssonii* of Rathke, but unfortunately omitted to observe the character of the telson." B. M. C., p. 53. Now if *Hyale pontica* really has two rami to the peduncle in the last uropods, that one little extra wart will cut it off from the family of the Orchestidæ, in which the last uropods are uni-branched. Yet there is nothing else to distinguish it from that family. Its antennæ, its gnathopods in both sexes, its general shape both of the body at large and the pleon in particular, will identify it with the Orchestidæ. Its habitat among stones and mussels on the beach, its colouring, clear bottle-green shading into brown, its

size, 3·6 lines, all coincide with the position in the system which Boeck has assigned to it. My own drawings of *Hyale* (*Nicea*) *lubbockiana*, Ann. and Mag. Nat. Hist. for May 1876, made years before I was acquainted with Rathke's work are in close agreement with those by W. Pape on Rathke's plate v. As in the Annals for November 1879, I identified *Allorchestes imbricatus*, Sp. Bate, with *Nicea lubbockiana* of the same author, so now, after seeing the strongly imbricated figure in Rathke's work, I am inclined to identify both with Rathke's *Hyale pontica*.

From Mr. Faxon's own observations, that in the type of *Allorchestes media*, Dana, the telson is cleft to the base, and that in fact the telson is probably cleft in *most* of the marine forms, which would be the bulk of Dana's genus, I think it is unreasonable to give the name *Allorchestes* to species with an entire telson. But *Nicea*, which has been assigned to the species with a double or cleft telson, cannot claim priority over *Allorchestes*. They are in fact both synonyms of *Hyale*. For the species with an entire telson there will then be left the name *Hyalella*, originated by S. I. Smith in 1874. See also Note on Brandt, 1851.

One other new Amphipod is described by Rathke from the Crimea under the name *Amphithoë picta*. Of this Spence Bate remarks, "I can detect no specific distinction between this species and *A. littorina* of our own shores." Nevertheless he retains the species, giving the description of it from Milne-Edwards instead of from Rathke. But Milne-Edwards describes the first and second gnathopods as "presque égales, mais assez larges," whereas Rathke himself says, "Das erste und zweite Beinpaar sind gleich lang und haben auch ziemlich gleich grosse, in Verhältniss zum ganzen Körper aber nur kleine Hände," and in his Latin description, "pedum duobus paribus anticis subæqualibus, chelis eorum minimis. In the British species or variety, "*Amphithoë littorina*, Spence Bate," the size of the gnathopods is very variable, so that Milne-Edwards' account may perhaps be unintentionally accurate. Rathke found his specimens "in the bay of Balaklava, where it habitually lodges under stones, and resembles Gammari in its mode of life."

1838. Milne-Edwards, H.

Histoire naturelle des Animaux sans vertèbres . . . . par J. B. P. A. de Lamarck. Deuxième Édition. Revue et augmentée de notes présentant les faits nouveaux dont la science s'est enrichie jusqu' à ce jour; Par MM. G. P. Deshayes et H. Milne-Edwards. Tome cinquième. Arachnoides, crustacés, annelides, cirrhipèdes. Paris, 1838.

The history of the Crustacea, the Eighth Class, occupies from page 154 to page 498 of this volume. Of the sub-class, Crustacés maxillés, the second legion, Edriophtalmes, contains the three Orders, Amphipodes, Loemipodes, Isopodes. At p. 256 the editor remarks that most authors have wrongly assigned as a character to the Isopoda, the absence of a palpiform appendage from the mandibles; he divides the Isopoda into three families, Cloportidiens, Cymothoadiens, Idotéidiens, in the second of which he places *Typhis*. However, at p. 285, a note signed "E" states that "les Typhis appartiennent à l'ordre des Amphipodes, et à la famille des Hypéridiens," and refers to the "article Typhis du Dictionnaire classique d'histoire naturelle, t. 16, p. 449." "Espèce. 1. Typhis ovoide. *Typhis ovoides*. Risso. Hist. nat. des crust. p. 122. pl. 2. fig. 9," is followed by references to Desmarest and Latreille and to "le *typhis ferus*" and "le *typhis repax*" [rapax], both of Milne-Edwards, but so given as to appear more like synonyms of *ovoides*, than separate species for which they are no doubt intended.

On les Caprellines, pages 293–299, an editorial note says, "Cette division correspond à l'ordre

des Læmipodes et se distingue facilement des autres Edriophthalmes par l'état rudimentaire de l'abdomen qui est réduit à un simple tubercule. Elle se subdivise en deux petites familles naturelles: les Caprelloidiens ou Læmipodes tiliformes et les Cyamoidiens ou Læmipodes ovalaires." In the first of these subdivisions, *Leptomera*, with the species *rubra* and *pedata*, still holds the place which belongs to *Proto ventricosa*, O. F. M., *Proton pedatum* being added from Desmarest to the synonymy of *Leptomera pedata*. *Caprella* has the species *scolopendroides* of Pallas, and *phasma* of Montagu, with references to additional species described by Latreille, Leach, Desmarest and Templeton. Under *Cyamus*, with the "Espèce. Cyame de la baleine. *Cyamus ceti*," *Cyamus oralis*, Roussel de Vauzème is also given, seemingly as a synonym. Latreille's unpublished East Indian species is mentioned, and the observation made that, "suivant M. Roussel de Vauzème, on aurait confondu sous le nom de *Cyamus ceti*, trois espèces de Cyames qui vivent toutes sur la baleine; mais ce naturaliste ne paraît pas avoir fait assez d'attention aux changemens de forme que l'âge amène chez ces animaux. (Voyez Ann. des Sc. nat. 2e série. t. 2.)"

On the Amphipods, pages 299–317, a note points out that there are six pairs of abdominal feet, instead of five as stated in the text, and where Lamarck says of the Amphipods, "c'est toujours sur le côté qu'ils se posent," a note observes that "plusieurs amphipodes qui ne lui étaient pas connus, n'ont pas le corps comprimé et nagent dans la position ordinaire," The editor observes that the Amphipods form two natural families:—

"1° Les Crévettiniens qui ont le corps grêle et allongé; la tête petite et les pattes-mâchoires recouvrant toute la bouche et formant une espèce de lèvre inférieure terminée par quatre grandes lames cornées et deux longues tiges palpiformes et qui ne sont pas parasites.

"Genres Crevette, Talitre, Corophie, etc.

"2° Les Hyperiniens qui sont plus ou moins parasites et ont en général le corps gros et bombé; la tête forte et les pattes-mâchoires très-petites, recouvrant seulement la base des autres appendices buccaux, terminées par trois lames cornées et dépourvues de tiges palpiformes ou n'en présentent que des vestiges.

"Genres Hypérée, Phronime, Tiphis (p. 285), etc."

On the species of *Phronima*, he remarks that they have seven thoracic rings, each with a pair of feet, the fifth of which ends in a didactyle hand; that they have also seven abdominal rings, the fifth and sixth more or less coalescent, and the seventh laminar. He thinks that *Phronima atlantica*, Guérin, may be only the young of *Phronima sedentaria*. *Hyperia*. Latreille, is given with three species, *latreillii*, *cyaneæ* and *pelagica*. The last of these he identifies with Say's *Lanceola pelagica:* the first with *Hiella orbignii*, Straus, and also with "*Oniscus medusarum?* Othon Fabricius," and "*Marstne*, Strom, Sondmor," both which he subsequently transferred to *Metoecus Medusarum*, Kröyer. "*Hyperia Swerii*" is likewise here a synonym of *Latreillii*, but later on under the name *Leseurii*, Milne-Edwards speaks of it as a distinct species. "*Phoreus Reynaudi*," M.-Edw.; "*Lestrigon Fabrei*," M.-Edw.; *Daira Gabertii*, M.-Edw.; *Themisto Gaudichaudii*, Guérin; *Dactylocera*, Latreille, and the species *Dactylocera Niceensis*, M.-Edw.; *Hieracongx abbreviatus*, Guérin; *Primno macropa*, Guérin; *Anchylomera Blosserillii*, M.-Edw.; *Anchylomera Hunteri*, M.-Edw.; *Pronoe capito*, Guérin; *Oxycephalus piscatorius*, M.-Edw.; *Oxycephalus occanicus*, Guérin; and *Vibilia Peronii*, M.-Edw.; have met with remark in earlier notes. On *Dactylocera* the observation is made that *Phrosina semilunata*, Risso, "paraît appartenir aussi à ce genre, comme l'a très bien remarqué Latreille (Règne anim. t. 4. p. 117)." On *Vibilia* the remark is made that Templeton's *Thaumalea depilis* "paraît devoir appartenir à ce genre."

To the account of the genus *Gammarus* is added the note, "les Crevettes forment le type d'une tribu particulière de la famille des Crevettiniens que nous avons designés sous le nom des *Crevettiniens sauteurs*, et que l'on reconnaît facilement au mode d'organisation de la partie postérieure de l'abdomen. Ce groupe renferme aussi les Talitres et quelques genres

nouveaux." In the species of *Gammarus* from the earlier edition, number 6, the *Pherusa fucicola* of Leach, is given as "Crevette fucicole. *Gammarus pherusa*," the last word probably by a slip. We are told to add a great number of species described or figured by various authors. The notes remark that in all these crustacea the upper antennæ have a peduncle of three joints with a multiarticulate lash, and that the peduncle of the lower antennæ has four joints. *Decamine*, Leach, is referred with hesitation to the "division des Amphitoës." Of *Leucothoë* the only species well known is said to be the *Lycesta furina* of Savigny, but the *Gammarus articulosus* of Montagu "paraît être aussi un Leucothoé." Leach's genera *Melita* and *Moera* [Mæra] are rejected. "Les Phéruses doivent être réunies aux Amphitoés dont elles ne diffèrent que par un peu moins d'élargissement dans les mains." *Amphitoë*, Leach, distinguished from *Gammarus* by the absence from the upper antennæ of an accessory flagellum, is accepted.

In the text of this oddly arranged work the following remarks occur as if part of the original edition, though the references show that they are not so:—"Nous avons donné le nom générique d'Isea à des Amphipodes qui sont très voisins des Crevettes, mais qui ont toutes les pattes subchéliformes (voyez Ann. des Sc. nat. t. 20. pag. 380, et Hist. des Crust. pl. 29, fig. 11).

"Dans notre genre Lysionasse il n'est au contraire aucune patte qui ait ce mode d'organisation (voyez le *Lysionassa costæ*. Edwards, Ann. des Sc. nat. t. 20, pl. 10, fig. 17).

' Le genre Phlias de M. Guérin ne diffère du précédent que par l'absence du filet multiarticulé accessoire des antennes supérieures. (Esp. le *Phlias serratus*, Guérin, Mag. de zool. cl. vii, pl. 19)."

To *Talitrus* Lamarck had assigned "bouche comme dans les Crevettes." A note here says "excepté que les mandibules ne portent que des vestiges d'une tige palpiforme." This statement probably rests not on original observation but on Savigny's figure of the mandible of *Orchestia montagui*, or on Guérin's figure of the mandible of *Talitrus platychelis*, 1835, since in 1840 Milne-Edwards says of *Talitrus*, "les mandibules (fig. 3) ne présentent que des vestiges d'un appendice palpiforme, ou en manquent même complétement. His figure shows no trace of a palp. Nevertheless it may be true that in some of the Orchestidæ there is a rudiment of it. Such at least I fancy that I have discerned in *Hyalella inermis*, S. I. Smith. Talitrus in Lamarck has three species, *locusta*, *gammarellus*, *carinatus*. A note to the second points out the difference of *Orchestia* from *Talitrus*, and that to *Orchestia* should be referred Savigny's figures 7 and 8 on Plate 11 of his great work, "*Orchestia Fischerii*, M.-Edw.," etc. A note on the third, which is Fabricius' species, referred by Leach to *Atylus*, says, "le genre Atyle doit prendre place dans la tribu des Corophioïdes ou Crevettiniens marcheurs et se distingue par ses antennes non pédiformes, et ses mains de la seconde paire très petites et à griffes simples."

Corophium is regarded as type of a tribe called here *Crevettiniens-marcheurs*, distinguished from the *sauteurs* by slender body, small epimera, tail not formed for leaping, and distinguished from other genera of the same division by pediform lower antennæ, upper antennæ without accessory flagellum, second gnathopods neither didactyle nor prehensile.

Jassa and *Podocerus* of Leach are distinguished from *Corophium* "en ce que leurs quatre pattes antérieures sont terminées par une grosse main subchéliforme," but it is rightly observed that they are distinguished from one another only by trifling characters. "Le genre Unciata de Say," the editor remarks, "doit prendre place auprès des genres précédens, mais s'en distingue par l'existence de deux tigelles multiarticulées à l'extrémité des antennes supérieures." Say's *Unciola* is of course intended. Say's *Cerapus* is mentioned with the type species *tubularis* and Templeton's *abditus*. It is then observed in conclusion:—"Enfin, notre genre Erichthonie établit le passage entre ces Crustacés et les Leucothoés; la conformation générale du corps est la même que chez les précédens, mais les antennes ne

sont pas pédiformes et les pattes de la seconde paire sont terminées par une longue main imparfaitement didactyle dont la griffe est biarticulée. (Voyez Ann. des Sc. nat. t. 20, p. 382, et Hist. nat. des Crust. pl. 29. fig. 12)."

1838? Costa, Oronzio Gabriel, and Costa, Achille.

Fauna del Regno di Napoli. Crostacei.

Preface, pp. 1–4, dated May 15, 1838, briefly notices what had been already done for Italian Crustacea, and proposes to follow Latreille's last classification of the Crustacea in his *Familles Naturelles du R. Anim.*

Animali articolati. Classe I. Crostacei (Crustacea) pp. 1–4.

In this paper Latreille's classification is given.

1838. Kroyer, Henrik Nikol, born 1799, died 1870 (G. O. Sars).

Grönlands Amfipoder beskrevne af Henrik Kröyer. (Som Tillæg; Beskrivelse af nogle andre grönlandske Kræbsdyr, og Optælling af Kræbsdyrklassens hidtil bekjendte grönlandske Arter, i Forbindelse med nogle zoologisk-geografiske Bemærkninger over de boreale Krustaceer). *Vid. Sel. naturvid. og mathem. Afh. VII Deel.* [1838]. pp. 229–326. Tab. I–IV.

The introductory observations note that Latreille and Milne-Edwards agreed in making twenty-four genera of Amphipods, but of this number had only thirteen in common. Burmeister's inclusion of the Læmodipoda and Pycnogonidæ in the order of Amphipoda is disapproved, and Milne-Edwards' definition and division of that order held to be the most satisfactory in the then existing knowledge of the subject.

The first species described is called "*Lysianassa Vahlii Rhrdt*," with the remark emphasized in regard to the second gnathopods, that the sixth joint or finger is altogether wanting, a statement which, nevertheless, requires corroboration. Kroyer assigns the species to Reinhardt, whose manuscript name for it he adopts, but it had, in fact, been previously described by Owen under the preoccupied name *Gammarus nugax*; Kroyer presently changed the name to *Anonyx vahlii*; Boeck in 1870 made it *Socarnes vahli*, but, as his *Socarnes* cannot fairly be distinguished from *Ephippiphora*, White, the name will be *Ephippiphora vahlii*, Kroyer (sp.). The next two species, figured and described respectively as "*Lysianassa Lagena Rhrdt*" and "*Lysianassa appendiculosa Kr.*," are now regarded as the female and male of *Cancer nugax*, Phipps, in the genus *Anonyx*, and will therefore stand under the name *Anonyx nugax*, Phipps (sp.). In describing *Lysianassa appendiculosa*, Kroyer calls attention to "small appendages, with which the flagella are furnished: the flagellum of the upper antennæ along its lower edge, that of the lower antennæ along its upper edge. I know," he says, "no other hitherto described Amphipod, in which anything of the kind is found, except in the *Gammarus ornatus* described by Milne-Edwards." These are the appendages since called calceoli. He also here observes that the number of joints in the antennæ increases with age, thus early giving a warning against the separation of species simply on the ground of differences in the length of the antennary flagellum. He then proceeds to remark that the three species just described were referred to *Lysianassa* as the only one among existing genera capable of receiving them, but that even that would require re-defining to include them with propriety. The monstrous size

of the peduncle of the upper antennæ, and the want of a finger and other peculiarities in the second gnathopods, were peculiarities so marked in the three species that he proposes a new genus for them, thus defined:—"Anonyx: *pedunculus antennarum superiorum crassissimus, ovalis; inferiorum multo gracilior, cylindricus; (oculi magni*); pedes primi paris breviores, parvulo instructi ungue; pedes secundi paris sat elongati, graciliimi, ungue carentes (quinquearticulati), ejusque vice ad finem articuli quinti multis validisque præditi setis.*" To this generic character, he says, may also be added, that the head in all the species is tolerably small, and partially concealed by the first side-plates, a rostrum projects in the middle in a little blunt point, formed by the small lateral excavations for the insertion of the antennæ, while the trunk is pretty strongly compressed, though dorsally rounded. Though not considering the mouth-organs of use for generic characters, he mentions that the mandibles are strong, furnished along the inner edge with three dental tubercles (Tandknuder), meaning, to judge by the figure, a divided tooth at the tip of the cutting edge and a small molar tubercle; the upper rim shows near the outer angle a tolerably deep incision; the palps are tolerably short. The second maxillæ have the lower lobe (inner plate) very small, furnished at the extremity with some long, plumose setæ. The maxillipeds have the palps long, the inner terminal plates narrow, linear. A footnote to the words "oculi magni" explains that a species otherwise in agreement with the genus need not be excluded merely on account of its having small eyes.

He next describes "*Gammarus Sabini* Leach," commonly known now as *Amathilla sabini*, but in my view having a claim to the title *Amathilla homari*, J. C. Fabr. He expresses surprise that it should have escaped the notice of [Otto] Fabricius, and calls attention to the very considerable differences between the young and adults, and the necessity for naturalists to take such variations into account if they would avoid the groundless multiplication of species. The next species described and figured, *Gammarus loricatus* Sab., has by Spence Bate been named *Gammaracanthus loricatus*, Sabine. The new species figured and described as *Gammarus pingris* is now called *Amathilla pinguis*. "*Gammarus Locusta*, Montagu," is judged to be the commonest of all the Greenland Amphipods, and to be undoubtedly identical with O. "*Fabricius's* Oniscus pulex (n. 231 pag. 254)." The suggestion is offered that it may be identical with *Cancer nugax* and *Gammarus nugax* in the English travels, dating "from Phipp's time." "*Amphithoe carinata* Rhrdt. (Tab, II, fig. 6)," is next described. This, which is the *Gammarus carinatus* of Fabricius, now bears the name *Atylus carinatus* given it by Leach. "*Amphithoe Hystrix.* (Acanthosoma Hystrix Owen). Tab. II, fig. 6 [7])," next described, has been identified by Boeck with Lepechin's species, under the name *Acanthozone cuspidata*, but the distribution of the species, according to the accounts of Lepechin, Krøyer and Boeck, makes the identification doubtful. In describing the flagellum of the upper antennæ, Krøyer remarks that, with exception of the four first joints, which are all furnished with hairs at the end of the lower edge, of the remainder, as a rule, only every alternate one exhibits hairs. Consequently, he says, those joints without hairs easily escape observation and cause discrepancies in counting the total number of joints. From the alternation just mentioned and from the considerable length of individual flagellum-joints in young individuals, he argues that the increased number of these joints in the adults results, not from the budding forth of new joints, but from the subdivision of the old ones. His description of the species in brief is:—"Amphithoe Hystrix: *fronte non rostrata; antennis superioribus dimidiam inferiorum partem non æquantibus; oculis orbicularibus, convexis; corpore parum compresso; annulis thoracis, tribusque abdominis anterioribus series aculeorum quinque præbentibus; primo thoracis annulo præ ceteris aculeato, cornu gerente procumbens et ad caput prominens; epimeris femori solito minus appressis, plerumque in aculeos productis; manibus linearibus, ungula præditis minuta; appendice caudali unica, postice*

aliquantulum emarginata." This is followed by a sharp criticism of the generic character given by Owen for *Acanthosoma*. "*Amphithoe Serra* Kr. (Oniscus serratus, Fabr. Fn. gr. n. 237), (Tab. II, fig. 8.)" is now *Acanthonotosoma serratum*. Kröyer changed *serratus* to *serra* to avoid displacing *Amphithoë serrata*, Say. "*Amphithoe panopla* Kr. (Tab. II, fig. 9)." has since been called *Pleustes panoplus*. "*Amphithoe bicuspis* Rhrdt (Tab. II, fig. 10).," has been referred successively to *Paramphithoë*, *Amphithopsis*, *Pherusa*, and *Pleustes*, and is restored by G. O. Sars in 1882 to *Paramphithoë*. "*Amphithoe inermis* Rhrdt. (Tab. III, fig. 11) (Oniscus Cicada Fabr. Fn. gr. n. 233 ?)," together with "*Amphithoe crenulata Rhrdt* (Tab. III, fig. 12). (Oniscus abyssinus Fabr. Fn. gr. n. 236 ?!)," has been already mentioned in the note on Otto Fabricius, 1780, as now bearing the name *Pontogeneia inermis*, Kröyer. "*Amphithoe læviuscula* Kr. (Tab. III, fig. 13)," is now called *Calliopius læviusculus*. "*Ischyrocerus anguipes Kr.* (Tab. III, fig. 14)," is now known as *Podocerus anguipes*, Kroyer, though not without the admission that it may be identical with the earlier *Podocerus cylindricus*, Say.

The new genus *Ischyrocerus* is thus defined:—"*Mandibulæ* magnis *instructæ* palpis *quorum ultimus articulus oboratus, fere truncatus; antennæ* pediformes; *pedunculus* (♂: *pars basalis*) *antennarum multo longior flagello* (♂: *parte terminali*), *quod perpaucis modo gaudet articulis; antennæ superiores* flagello appendiculari *breri,* uni-articulato *ornatæ; pedes primi paris minuti sed validi, manumque gerentes; pedes secundi paris maximi, manu portentosæ in adultis magnitudinis armati; reliqui pedes solito ferme more conformati; pedes spurii quarti, quinti & sexti paris saltatorii; articulus basalis sexti paris articulis terminalibus triplo vel quadruplo longior; annuli abdominales tres anteriores annulis thoracis breviores; epimeri mediocris magnitudinis.*" The name *Ischyrocerus* is a synonym of the earlier *Podocerus*.

"*Meloecus Medusarum* Kr. (Tab. III. fig. 15). (Oniscus Medusarum Fabr. Fn. gr. n. 232).," was transferred by Boeck to Dana's genus *Tauria*, the name *Meloecus* being pre-occupied. Bovallius, however, argues that the species cannot properly be separated from *Hyperia*, and the specific name *medusarum* being pre-occupied in that genus, he calls the present species "*Hyperia Kroeyeri.*" But if G. O. Sars, 1882, be right in identifying *Tauria abyssorum*, Boeck, with the so-called *Tauria medusarum*, the species will by the law of priority become *Hyperia abyssorum*. The genus *Meloecus* is thus defined by Kroyer:—"*Pedes primi et secundi paris reliqvis permulto breviores, sed validi,* manuqve armati cheliformi. *Articulus horum pedum quartus qvi forma præditus est triangulari, manum efficit, a cujus margine inferiori prodeunt pollex biartirularis anterior et digitus posterior. Primus pollicis articulus* (*v. qvintus pedis*) *magnus, conicus; secundus unguis est pusillus. Digitus conicus, pollice aliqvantillum brevior. Margo utriusqve pollicis articuli posterior, margoqve digiti anterior per totam longitudinem serrati. Cetera cum genere Hyperia ferme conveniunt.*"

"*Themisto arctica* Kr. (Themisto Gaudichaudii Ross.). (Tab. IV, fig. 16).," and "*Themisto crassicornis* Kr. (Tab. IV, fig. 17).," are by Boeck both made synonyms of *Themisto libellula*, Mandt. Kroyer himself felt he had grounds for believing that his *Themisto arctica* was not identical with "*Themisto Gaudichaudii Guérin,*" but that it might well be so with "*Ross's* Themisto Gaudichaudii."

"*Lestrigonus exulans* Kr. (Tab. IV. fig. 18)," is considered by Boeck and others to be the male of *Hyperia medusarum*, O. F. Müller. F. H. Streets would keep the genus *Lestrigonus* distinct from *Hyperia*. "*Hyperia oblivia* Kr. (Tab. IV. fig. 19)," is also held to be a synonym of *Hyperia medusarum*, O. F. M.

The second part of this work is concerned with Crustacea outside the order of Amphipoda. In the third part Kroyer reviews the Greenland Crustacea in general, naming, among the fifty-eight species which, he says, had come under his own observation, the Amphipods already discussed, which are numbered from 11 to 31 in the series. Under number 38 he

says, "*Caprella septentrionalis* (Squilla lobata Fabr. Fn. gr. n. 225) not only differs very considerably from the *Caprella quadriloba* (Capr. linearis Latr.) which occurs with us, in the form of the second pair of hands, etc., but, so far as I can judge, is also distinct from all known European species. It seems frequent in the Greenland Sea, but is not mentioned by Sabine and Ross." He subsequently figures and describes *Caprella septentrionalis*, Kr., in the Nat. Tidsskr., pp. 590–596, Tab. VIII. fig. 10–19, without reference to *Squilla lobata* of O. Fabricius. Under number 39 he says, "*Cyamus Ceti* (Oniscus Ceti Fabr. Fn. gr. n. 230), is sent both from northern and southern districts."

Of the species recorded by O. Fabricius, of which Kroyer personally knew nothing, he thinks that "*Oniscus arenarius* (Fn. gr. n. 234)" may be a *Gammarus* or *Amphithoe*, and "*Oniscus stroemianus* (Fn. gr. n. 235)" an *Orchestia*, as supposed by Milne-Edwards. He then mentions from English authors "*Amphithoe Edwardsii* (*Talitrus Edwardsii Sab. tab. 2. fig. 1–4*)," "*Amphithoe cristata* (Acanthonotus cristatus, Owen. App. to the Voy. of Ross. tab. B. fig. 8–12)," which he says seems to stand pretty near to *Amphithoe Serra*, and "*Hyperia Cyaneæ* (Talitrus Cyaneæ Sab. tab. 1, Fig. 12–18)," all which have been already discussed. In a note he expresses disappointment that Owen should have left *Cancer boreas*, *Cancer ampulla* and *Cancer nugax* of Phipps without elucidation.

In the ten orders of Crustacea, which Kroyer here admits, he reckons that the Arctic species number 68, or, taking the number of all then known Crustacea to be 1500, the Arctic species furnish a proportion of about 1 to 22. In these 68, 26, he says, are Amphipods, giving the large proportion of 26 out of a total of 99 then known from the world at large. The total is arrived at by the combination of his own list with that furnished by Milne-Edwards. It should be observed that two species of Læmipoda are here not included in the number of the Amphipoda.

Lastly, Kroyer calls attention to the tendency in the genera *Gammarus* and *Amphithoe*, as he accepted them, to develop sharp and angular forms, with horn-like processes and spines, the more conspicuously the higher the latitude. As examples he adduces "*Gammarus loricatus*, *Gammarus Sabini*, *Amphithoe Edwardsii*, *Amphithoe Hystrix*, *Amphithoe cristata*, which all extend very far within the Polar zone."

1838. KROYER, H. N.

Conspectus Crustaceorum Groenlandiæ. Naturhistorisk Tidsskrift. S. I. B. II. pp. 249–261. 1838.

This is stated by the author to be chiefly an epitome of his previous work on the Amphipoda of Greenland with very few alterations. For the three species assigned in that work to *Lysianassa*, he now gives the name *Anonyx*. After the description of *Amphithoe serra*, Kr., the epitome breaks off with the notice, "continuabitur."

1839. ANDRZEIOWSKI, ANT.

Catalogue des objets qui se conservent dans le cabinet zoologique de l'université impériale de St Vladimir à Kiéf. Iere Partie: Mammifères, oiseaux, reptiles, poissons et crustacées. Par A. Andrzeiowski. 1838. Bulletin de la Société Impériale des Naturalistes de Moscou. Année 1839. No. 1. Moscou, 1839.

In the "État de la Collection en 1833," the "Crustacées" comprise only one Amphipod, "Gammarus Pulex." For "Année 1838," under the same heading the following Amphipods

are named; "Orchestia littorea Leach. Gammarus Pulex Fabr. ind. Gammarus marinus Leach. Odessa. Gammarus stagnalis Nob. K." "ind" signifies "indigène de ces Gouvernemens," "K" stands for "Kief." To *Gammarus stagnalis*, a note is given as follows:—Celui-ci diffère du précédent par ses yeux elliptiques réniformes, bien plus grands en raison de la tête que ceux du *G. Pulex*, malgré que l'animal lui-même ne le surpasse pas par sa taille. Les appendices de la queue surpassent en longueur les deux derniers articles de la queue, tandis qu'ils sont plus courts dans le *G. Pulex*. On peut les définir ainsi; *G. Pulex* oculis oblongis exiguis, appendicibus caudalibus duobus articulis ultimis caudæ brevioribus. *G. stagnalis* oculis reniformibus magnis, appendicibus, duos ultimos articulos caudæ superantibus." The characters given are insufficient for specific distinction. It is therefore of little importance that the name *Gammarus stagnalis* is preoccupied as a synonym for a non-Amphipod Crustacean, *Branchipus stagnalis*.

1839. Philippi, Rudolph Amandus, born September 14, 1808 (Hagen).

Einige zoologische Notizen von Dr. A. Philippi. 5. *Chelura terebrans* ein neues Amphipoden-Genus. Fig. 5. Archiv für Naturgeschichte. Wiegmann. Fünfter Jahrgang. Erster Band. Berlin 1839. pp. 120–121.

The earliest known description of this singular, mischievous, common, and, since Philippi's paper, often-described Amphipod is as follows:—"Das Thier ist, einschliesslich Fühler und Schwanzanhänge $4\frac{1}{3}'''$ lang und ohne dieselben $2\frac{3}{4}'''$ lang, und gegen $\frac{3}{4}'''$ breit. Der Kopf ist am schmalsten und so lang als die zwei folgenden Segmente, der Körper wird vom Kopf an allmählig breiter ohne sich jedoch bedeutend von der linealischen Form zu entfernen. Die *Augen* sind klein und rund; die obern Fühler von mässiger Länge, borstenförmig, siebengliedrig. Die *untern Fühler* sind anderthalb mal so lang und bestehn aus 6 Gliedern; die beiden ersten Glieder sind sehr kurz, die übrigen nehmen allmählig an Länge zu, werden platter und die letzten sind dicht gewimpert, so dass sie eher ein Organ zum Schwimmen als zum Tasten zu sein scheinen. Die *Brustsegmente* sind gleich lang und haben ihre Seitentheile nur sehr wenig entwickelt. Der *Schwanz* oder *Abdomen* ist fünfgliedrig; die beiden ersten Glieder sind den Brustsegmenten ähnlich, das dritte Glied trägt auf der Mitte des Rückens ein langes gekrümmtes Horn, welches ganz dem der Sphinx-raupen gleicht, und jederseits noch 2 kleine Spitzen. Das vierte Glied ist anderthalbmal so lang als breit, unten ziemlich flach, oben concav mit kleinen Höckerchen besetzt, an den Seitenrändern gewimpert. Zwei kleine Höckerchen in der Mitte des hintern Randes zeichnen sich besonders aus. Dieses Glied trägt jederseits zwei Paar sonderbare Anhängsel, die an seinem Grunde eingelenkt sind. Die obern Anhängsel sind senkrecht aufgerichtet und bestehn aus 3 länglichen abgerundeten Lappen, die alle mit langen Haaren dicht gewimpert sind, und von denen der vorderste der grösste, der hinterste der kleinste ist. Das seitliche Paar Anhängsel entspricht vollkommen einem der Schwanzanhängsel der Gammarinen und besteht aus einem Stiel, der zwei kleine spitze Blättchen trägt. Das fünfte Glied ist sehr kurz, zeigt unten in einer Spalte den After oben in der Mitte und an seinem Grunde (oder am hintern Rande des 4ten Gliedes) eingelenkt ein ovales Blättchen und an seinem Ende eine ungeheure *Zange*, die beinahe anderthalbmal so lang als die beiden letzten Schwanzglieder ist. Ihre beiden Blätter sind flach gedrückt, etwas divergirend, gegen das Ende verschmälert und hakenförmig gebogen, und haben gezähnelte Ränder. Die 14 *Füsse* nehmen von vorn nach hinten an Länge zu, jedoch nicht bedeutend. Die beiden ersten tragen am Ende eine umgebogene Klaue und der Tarsus ist breit mit einem divergirenden Zahn. Das erste Fusspaar ist weit breiter als

das zweite. Die folgenden Füsse enden mit einer langen graden nur an der Spitze schwach hakenförmig gebogenen Klaue, die drei hintern haben nur ein kleines blattartiges Hüftglied. Die *Kiemen* an ihrem Grunde habe ich nicht gesehen, desto deutlicher die 3 Paar *falscher Abdominalfüsse*, die aus einem beilförmigen, lamellenartigen Grundglied und zwei gegliederten und gewimperten Borsten bestehn; so dass über die Ordnung der Crustaceen, zu welcher das Thierchen gehört, kein Zweifel sein kann. Die *Kauwerkzeuge* schienen mir aus einer ausgerandeten Oberlippe, einem Paar mit 2gliedrigen Palpen versehenen Mandibeln, drei (?) oder vier (?) Paar lamellenartiger Maxillen, und 2 sechsgliedrigen Kaufüssen zu bestehn."

1839. Rathke, Heinrich.

Beobachtungen und Betrachtungen über die Entwickelung der *Mysis vulgaris*. Archiv für Naturgeschichte. Wiegmann. Fünfter Jahrgang. Erster Band. Berlin 1839.

This paper on the development of *Mysis vulgaris* is illustrated throughout by reference to corresponding facts in regard to the Isopoda and Amphipoda.

1839. Wiegmann, Arend Friedrich August, born 1802, died 1841 (Hagen).

Abweichende Form der Blutkörperchen und Blutlauf bei Lämopoden. Vom Herausgeber. Archiv für Naturgeschichte. In Verbindung mit mehreren Gelehrten herausgegeben von Dr. Ar. F. Aug. Wiegmann. Fünfter Jahrgang. Erster Band. Berlin 1839. pp. 111–112.

"In a little *Leptomera* from the Skagerak," Wiegmann observed that the blood corpuscles were not round or roundish, but "elongate, thin at either end, fusiform." In the gnathopods and other limbs he observed "two active currents, the one arterial, descending, on the hinder side of the legs, the other ascending, on their front side. Each passes through the whole extent of the limb, till at the end of the foot the descending bends round into the ascending."

1840. Bennett, F. D.

Narrative of a Whaling Voyage round the Globe. Vol. II. pp. 169. 234. 237.

To this work Lütken refers for mention of Whale-lice (*Larunda ceti*) on the Cachalot, p. 169, a Cetacean on which Roussel was unable to find any *Cyamus*. On a Dolphin, larger than the common Dolphin (*Delphinus delphis*), and which in the spaces between the teeth in both jaws had cavities to receive the teeth from the opposite jaw, "some *Oniscі* adhered to the body," p. 237. In reference to "the Blackfish of South-Sea Whalers," he says, "a few whale-lice (*Larunda ceti*) adhere to the skin of this Cetacean," p. 234. See Lütken, 1873, p. 14 (242).

1840. Costa, O. G. and Costa, A.

Catalogo de' Crostacei del Regno di Napoli. pp. 1–7.

Here, as Order III. of the Malacostraci, stand the Amfipodi, including "Phronima sedentaria. Phronima custos. Phrosine semilunata. Orio zancleus. Coc. *Sicilia*. Orio oxyrhinchus, Prest. *ivi*. Orio ornithoramphus. Scinà ensicorne, Prest. *Sicilia*. Cleistotoma Gemmellari, id. Orchestia littorea. Talytrus locusta. Lisianassa Costæ, Edw. Gammarus pulex. Gammarus marinus? Dexamine spinosa. Leucothoe articulosa. Amphithoe annulata, n. Sannazaria pallida, n. Callisoma punctata, n. Typhis ovoides. Anceus forficularius. Praniza cœruleata." As Order IV. stand the Lemodipodi, including "Caprella phasma. Caprella linearis. Caprella acutifrons. Cyamus acutifrons, n. Sicilia." No descriptions, and in most cases no authorities.

Costa's figure of *Phrosina semilunata*, Risso, "Fn. Nap. tav. IV, fig. 1–5," cannot be of later date than 1840, as Milne-Edwards refers to it, Hist. nat. des Crust., iii., p. 91, with the following observation, "la *Phrosine semilunaire*, à en juger par la figure très-détaillée qu'en a donnée M. Costa, diffère de l'espèce précédente par l'absence d'une grosse dent à l'angle antéro-inférieur du pénultiéme article des pates antérieures, par la forme plus acuminée des lames natatoires que représentent les trois dernières paires de fausses pates, et par quelques autres caractères." The preceding species referred to by Milne-Edwards is his own *Phrosina Nicetensis*. Costa himself in 1857 gives the following references, which are probably all of later date than 1840:—"*Orchestia deshayesii*, Aud., Edw., A. Cost. Faun. Nap. tav. VIII bis, fig. 3"; *Talitrus platycheles*, Guer.—A. Cost. Fn. Nap. tav. VIII bis, f. 2."; "*Lysianassa Costæ*, Edw.—A. Cost. Fn. Nap."; "*Callisoma punctatum*, Cost. Fn. Nap. Tav. VIII, fig. 4–7"; "*Callisoma Hopei*, A. Cost. Fn. Nap. Tav. VIII bis, fig. 1." *Leucothoe denticulata*, A. Cost., "Fn. Nap. Tav. IX., fig. 3. (senza testo)." *Vibilia speciosa*, A. Cost. "Fn. Nap. tav. IX, fig. 1 (senza testo).", and the *Phrosina* already mentioned.

1840. Lucas, Hippolyte.

Histoire Naturelle des Crustacés, des Arachnides et des Myriapodes. Paris. M DCCC XL.

In the account of the orders Læmodipodes and Amphipodes, pages 219 to 240, no original information appears to be given. There is a full account of *Cyamus*, taken from Roussel de Vauzème. Of the Læmodipodes filiformes the genera mentioned are *Leptomera*, *Vanpredia*, *Caprella*. In the definition of *Leptomera*, the legs "ne paroissent pas tous pourvus d'appendices en forme de sac vésiculeux à leur base, ou même n'en ayant pas du tout." Of the species, *Leptomera ventricosa*, he says, "Cette espèce présente un appendice en forme de lobe à tous les pieds, les deux premiers exceptés. M. Latreille lui rapporte aussi l'espèce représentée par Slabber, *Micros.*, tab. 10, fig. 2, et le *Cancer Pedatus*, Montagu. *Transact. Linn.*, t. xi, pl. 2, fig. 6, qui en a tous les pieds pourvus, moins ceux de la première et des trois dernières paires." *Proto ventricosa*, O. F. M., has in fact only three pairs of branchiæ, though Slabber figures it with six pairs. *Vanpredia* is here as usual without a species.

In the account of the Amphipodes the first mentioned is *Orchestia littoralis*, with references to Leach in the Edinb. Encycl. and the Linnæan Transactions, in both of which he remarks that his *Talitrus littoralis* is the female of *Talitrus locusta*. Of *Orchestia littoralis* he makes no mention. The name *Gammarus fluviatilis*, M.-Edw., is used for the *Squilla pulex*

of Degéer, while *Gammarus roeselii*, Gervais, is entered without reference to Roesel. The genera assigned to the first family, Crévettines, are *Orchestia, Talitrus, Lysianassa, Gammarus Amphithoe, Phlius*, "*Isæa*," *Leucothoe*. To the second family, Podocérides, are assigned *Erichtonius, Atylus, Uneiola, Cerapus, Podocerus, Corophium*. On "*Corophia longicorne*" d'Orbigny's observations are as usual quoted. To the third family, Hypérines, are assigned the genera, "*Vibilia, Hyperia, Phorcus, Lestrigon, Daira, Themisto, Hieracongx, Dactylocerus, Anchylomera, Phronima, Primno, Tiphis, Pronoe, Oxycephalus.*" The descriptions of Guérin's genera are given with great fulness. To each of the species "*Vibilia Peronii*," M.-Edw., "*Phorcus Reynaudii*," M.-Edw., *Lestrigon Fabrei*," M.-Edw., "*Daira Gabertii*," M.-Edw., the remark is attached, "Cette espèce est encore inédite," as though the species were still undescribed, but it is obvious that, when a new genus is established for a single species, the characters of the genus are for the time those of the species also. Part of Plate 17 and the whole of Plate 18 are devoted to figures of Amphipoda, but the figures are not original. The names of *Cerapus tubularis* and *Corophium longicorne* are interchanged on Plate 18.

1840. MILNE-EDWARDS, HENRI.

Histoire naturelle des Crustacés, comprenant l'anatomie, la physiologie et la classification de ces animaux. Tome troisième. Ouvrage accompagné de planches. Paris, 1840.

This volume opens with the Édriophthalmes of Leach as second legion of the subclass "Crustacés maxillés." To mark them off from other Crustacea, Milne-Edwards points out that they have the body divided into three very distinct parts, head, thorax, and abdomen, the rings of the two latter being almost always distinct and free to move; they have no carapace, no movable peduncle to the eyes, although like the Podophthalma they have the mouth armed with mandibles and maxillæ, and the thoracic limbs all or almost all in the form of ambulatory feet. They do not, however, breathe by branchiæ properly so called but by the help of a portion of the locomotive limbs, wholly or in part modified for the purpose; "tantôt c'est l'appendice flabelliforme des pates thoraciques qui affecte la forme d'une grande vésicule membraneuse à texture délicate, et qui devient ainsi propre à servir d'instrument à la respiration." In the small number of species in which the inner structure is known, "le foie est remplacé par trois paires de canaux biliaires, le cœur a la forme d'un vaisseau dorsal situé tantôt dans le thorax, tantôt dans l'abdomen, et les organes génitaux se rapprochent, par leur structure, de ce qui se voit chez les Insectes." They form, he says, three natural classes thus distinguished :—

Édriophthalmes ayant,	l'abdomen bien développé et pourvu de cinq ou six paires de membres.	Des vésicules branchiales sous le thorax. Membres abdominaux des cinq premières paires héteromorphes et servant à la locomotion.	Amphipodes.
		Presque jamais de vésicules branchiales sous le thorax. Membres abdominaux des cinq premières paires à peu près de même forme, impropres à la locomotion, et paraissant remplir les fonctions de branchies.	Isopodes.
	l'abdomen rudimentaire dont la forme est celle d'un petit tubercle sans appendices bien distincts. Des vésicules branchiales suspendues au thorax.		Læmodipodes.

In his general description of the Amphipod structure, Milne-Edwards notes that the mandibles are "pourvues, en général, d'une tige palpiforme," that the dorsal arch in the thoracic segments is generally "composé de trois pièces bien distinctes, savoir: un tergum et deux épimères," that at the base of most of the thoracic limbs there is on the inner side "une grande vésicule membraneuse qui semble être le représentant de la branche externe des pates-mâchoires et des pates ordinaires chez certains Podophthalmes, et qui présente ici tous les caractères d'un organe de respiration." The females, he continues, carry their eggs under the thorax, and often have filabelliform appendages fixed to the base of the feet to serve this purpose, but at other times their functions are discharged by the respiratory vesicles. He does not, however, here specify any instances to justify the last observation, but subsequently he applies it to the genus *Hyperia* and the genus *Phronima*, asserting that in the latter genus there are five pairs of branchial vesicles, not three pairs only as commonly supposed. He says that the Amphipoda are all aquatic—a statement, which, in the light of later discoveries, requires some modification. He divides the order into two groups or families in the following manner:—

"Pates-mâchoires très grandes recouvrant toute la bouche et formant une espèce de lèvre sternale impaire terminée par quatre grandes lames cornées et deux tiges palpiformes très-longues. . . Famille des Crevettines.

"Pates-mâchoires ne recouvrant que la base des appendices précédents, et formant une espèce de lèvre sternale impaire terminée par trois lames cornées, et dépourvue de tiges palpiformes ou n'en ayant que des vestiges, ... Famille des Hypérines."

The Crevettines he divides into the Tribu des Sauteurs with twelve genera, and the Tribu des Marcheurs with seven genera. The first Tribe contains two groups, the first of which, comprising only *Talitrus* and *Orchestia*, "essentiellement arénicoles, ne présentent au plus que des vestiges d'une tige palpiforme aux mandibules." The remaining ten genera form the second group, which live habitually in the water and have a very long mandibular palp.

In the description of genera and species under *Talitrus*, Latr., he gives the species, 1. *saltator*, named from the *Squilla saltatrix* of Klein rather than from *Oniscus locusta* of Pallas, or *Cancer locusta*, Linné; 2. *Beaucoudraii*, M.-Edw.; 3. *brevicorne*, n. s., from New Zealand; 4. *platycheles*, Guérin; 5. "*Cloquetii*, (Audouin), Savigny."

Under *Orchestia*, Leach, "§ 1. Espèces dont les pates de la sixième paire sont à peu près de même grandeur que celles de la septième, ou un peu plus petites," he includes the species, 1. *littorea*, Leach, with references to Baster, Herbst, Montagu, &c., and the observation that *Oniscus gammarellus* of Pallas and *Oniscus stroemianus* of Otto Fabricius and *Talitrus gryllus* of Bosc, all seem to belong to this division of the genus *Orchestia*: 2. "*Montagui*," Audouin; 3. "*Bottae*," n. s., "espèce très voisine de l'Orchestie sauteuse, mais dont les pates de la septième paire sont étroites et de même forme que celles de la paire précédente. Habite la mer Rouge," where as Sp. Bate suggests, he has probably written *sauteuse* by mistake for *littorale* or *littorea*. 4. "*Deshayesii*, Audouin;" 5. *longicornis*, Say's *Talitrus longicornis*; 6. "*Chiliensis*," n. s., which Dana and Spence Bate call *Chilensis*; 7. "*Quoyana*," M.-Edw., called *Talorchestia Quoyana* by Dana and Spence Bate.

"§ 2. Espèces dont les pates de la sixième paire sont beaucoup plus grandes que celles de la septième paire" has the species 8. "*Fischerii*." M.-Edw., figured pl. 29. fig. 4.

In the genus Lysianassa he places the species, 1. "*Costæ*," M.-Edw.; 2. *lagena*, answering to "*Lysianassa lagena* vel *Anonyx lagena*, Kröyer;" 3. "*Vahlii*," Kröyer's *Anonyx Vahlii*;

4. *appendiculata*, answering to "*Lysianassa appendiculata* vel *Anonyx appendiculatus*, Kröyer;" 5. *atlantica*, for his own *Gammarus atlanticus;* with the concluding observation that *Cancer ampulla*, Phipps, and the imperfectly known *Cancer nugax*, Phipps, appear also to belong to this genus.

He forms the new genus *Alibrotus* with the one species "*Chauseicus*," to receive *Lysianassa chauseica*, Milne-Edwards, and defines it thus:—"Les Alibrotes, que nous avions d'abord réunies aux Lysianasses, s'en distinguent par la longueur considérable des antennes et la forme grêle de celles de la première paire, qui ressemblent tout-à-fait à celles des Crevettes, et par la conformation des pates des deux premières paires qui sont grandes, fortes et propres à la marche et à fouir; elles ont à peu près la même forme et se terminent par un grand article plat et allongé, dont le sommet est armé d'un ongle gros, conique, et à peine flexible. Du reste, ces animaux ne diffèrent pas notablement des Crevettes." To this genus Spence Bate in the Brit. Mus. Catal., p. 86, adds "*Anonyx littoralis*, Kröyer, Voy. en Scand. pl. 13. f. 1.," but without reference to Kröyer's own account of it, Nat. Tidssk. 2. R. 1. B. 1844, pp. 621–629, which describes the first joint of the upper antennæ as of the thickness usual in the genus *Anonyx*, and the second gnathopod as nearly filiform. Boeck includes *Anonyx litoralis*, Kroyer, and two other species in a new genus *Onesimus*, to which he appends *Alibrotus* as a doubtful synonym.

Milne-Edwards next gives *Phlias*, Guérin, with its one species, *serratus*, Guérin. *Acanthonotus*, "Owen et J. C. Ross," receives the species (1) *cristatus*, Owen; (2) *Nordmannii*, n. s., thus described:—"*Front dépourvu de rostre*, mais formant au-dessus de la base des antennes inférieures, une grande protubérance qui loge les yeux, et qui porte à son extremité les antennes supérieures (à peu près comme chez les Ischyrocères). Antennes très-grêles et assez longues; le pédoncule de celles de la paire [supérieure] très-court, et le filet terminal long, mais ne dépassant que de peu le pédoncule des antennes inférieures. Thorax et abdomen arrondis et sans dents ni épines en dessous. Pièces épimériennes des quatre premiers anneaux extrêmement grandes. Pates de la première paire ayant leur pénultième article élargi en dessous, près de sa base, et la griffe assez longue, de façon à ressembler à une petite main très-imparfaite. Pates de la seconde paire filiformes et sans trace d'une main prehensile. Pates de la troisième et de la quatrième paire ayant leur troisième article très-grand, et élargi, les deux suivants très-petits et le dernier très-long, mais grêle et styliforme. Pates des trois dernières paires courtes, mais ayant leur premier article très-grand et presque aussi large que long. Fausses pates de la dernière paire beaucoup plus saillantes que celles des deux paires précédentes, et pourvues de deux lames lancéolées de même longueur. Abdomen terminé par deux lames sublancéolées dont le bord interne est droit. Longueur environ 5 lignes. Habite les côtes de la Crimée." This species appears to be still unidentified. It does not appear among the Mediterranean species in the recent work by Victor Carus. In the Brit. Mus. Catal., Spence Bate re-names it *Protomedeia nordmannii*. Kröyer, Nat. Tidssk., 4 Bd. 1842, p. 161. n., had already expressed his belief that the species could not be retained in the genus *Acanthonotus*, but without proposing to place it in the genus *Protomedeia*, which he had just instituted, *loc. cit.*, p. 154, and since to that genus he assigns "Epimera sat brevia," while to *Acanthonotus nordmannii* Milne-Edwards assigns "Pièces épimériennes des quatre premiers anneaux extrêmement grandes," the union of this species to that genus is hardly likely to stand. The difficulty of such union is augmented by the statement in Boeck, De Skand. og Arkt. Amph. p. 576, that "Pedes secundi paris parvi, manu non instructi subcheliformi" in Kroyer's generic definition is a slip of the pen for "Pedes primi paris." Milne-Edwards considers rightly that *Amphitoe serra*, Kröyer, ought to be placed in the genus *Acanthonotus*, and wrongly that *Oniscus cicada* of Otho Fabricius is probably the same species; he thinks further that *Gammarus spinosus*, Montagu, the type of Leach's

genus *Decamine*, may well also be an *Acanthonotus*, but that further information is needed about it.

After describing the genus *Isæa* with its type species, *Isæa montagui*, Milne-Edwards, which is figured pl. 29, fig. 11, he passes to *Anisopus*, with its single species *dubius*, Templeton, for which see Note on Templeton, 1836.

Accepting the distinction of *Amphitoë* from *Gammarus* as convenient and in general use, though depending only on the absence of the accessory flagellum from the upper antennæ of the former, Milne-Edwards unites under this name the "*Ampitoe*," *Pherusa* and *Decamine* of Leach. On the other hand he divides and subdivides his own *Amphitoë* as follows:—

"§ 1. Espèces dont le dos est arrondi et dépourvu de grandes dents médianes.

"A. Thorax et abdomen depourvus d'épines.

"*a*. Antennes supérieures au moins aussi longues que les antennes inférieures," with the species 1. *Jurinii*, M.-Edw.; figured pl. 1. fig. 2.; 2 *leviuscula*, Kröyer; 3. *Pausilipii*, M.-Edw.; 4. *indica*, M.-Edw.; 5. *picta*, Rathke; 6. *Gaudichaudii*, n. s., from Brazil, in which he emphasises the peculiarity "*Hanche des pates de la troisième et quatrième paire ovalaire* (au lieu d'être presque linéaire comme d'ordinaire);" 7. *Filosa*, Savigny, from which he thinks that "l'Amphitoé de Ramond, and l'Amphitoé des varecs," as he names *Pherusa fucicola*, Leach, scarcely differ. He gives notes on *Gammarus obtusatus*, Montagu, for which he had already proposed the name *Amphitoë obtusata*; on l'Amphitoé rouge, that is, the *Gammarus rubricatus* of Montagu, or *Amphitoe rubricata* of Leach; and lastly on l'Amphitoé dentele, Say's fresh-water *Amphitoe dentata*.

"*aa*. *Antennes supérieures moins longues que les inférieures.*

"*aa**. *Mains des deux premières paires à peu près de même grandeur*," with the species, "8. *Crenulata*," Kröyer; 9. *inermis*, Kröyer, to which he appends a note, "*Oniscus cicada?* Oth. Fabricius, Fauna Groenl. p. 258,"; 10. "*Armorica*," M.-Edw.; 11. "*Reynaudii*," M.-Edw.; 12. "*Swammerdamii*," M.-Edw.; 13. *punctata*, Say.

"*aa***. *Mains des pates de la seconde paire plus de deux fois aussi grosses que celles des pates antérieures*," with the species 14. "*Prevostii*," M.-Edw.; 15. *pelagica*, M.-Edw.; 16. "*Gaimardii*," n. s., which Dana transferred to *Allorchestes Gaimardii?*, and for which Spence Bate adopts the name *Allorchestes Gaimardii*, making *Allorchestes compressa*, Dana, a synonym of it; 17. *pontica*, with *Hyale pontica*, Rathke, for a synonym.

"AA. *Côtés du thorax ou le dessus de l'abdomen, garnis d'épines ou de petites dents.*

"AA*. *Des épines sur les flancs.*"

18. *cancella*, the *Oniscus cancellus* of Pallas.

"AA**. *Flancs dépourvus d'épines.*"

19. *bicuspis*, Kröyer; 20. *podura*, Müller's *Gammarus podurus*; 21. "*Fresnelii*, Audouin."

"§ 2. *Espèces dont le dos est plus ou moins caréné en dessus et armé vers sa partie postérieure de grandes dents médianes comprimées et dirigées en arrière.*

"B. *Front dépourvu de rostre.*"

22. *costata*. M.-Edw.; 23. *hystrix*, the *Acanthosoma hystrix* of Owen; 24. *Marionis*, M.-Edw.; 25. "*Panopla*," Kröyer; 26. "*Carinata*," Kröyer, followed by the concluding observation that Say's *Amphitoe serrata* "a le dos dentelé comme les espèces précédentes, mais parait s'en distinguer par l'existence de trois épines saillantes situées à égale distance l'une de l'autre sur le bord inférieur de chacune des mains."

CREVETTE. *Gammarus*, Fabricius, is thus subdivided:—

"§ 1. *Espèces dont les yeux sont ovalaires, réniformes ou linéaires.*

"A. *Bord postérieur des trois premiers segmens de l'abdomen droit et ne se prolongeant pas de manière à former une grosse épine ou dent médiane.*

"*a*. *Des épines sur la portion dorsale du quatrième et du cinquième anneaux abdominaux*," with the species, 1. *locusta*, referred to *Oniscus pulex?* O. Fabr., *Cancer Gammarus locusta*,

Montagu, etc.; 2. *fluviatilis*, Roesel, which does not agree with the character "A"; 3. *fasciatus* Say, with which he identifies Say's *Gammarus minus* giving the specific name as *minimus;* 4. *marinus*, Leach; 5. *Olivii*, M.-Edw.; 6. *affinis*, a new species, which "ressemble presqu'en tout à la Crevette d'Olivi, mais s'en distingue parce que les mains de la première paire, au lieu d'être un peu plus petites que celles de la seconde paire, sont beaucoup plus grosses," and which Spence Bate unites along with *Gammarus olivii* to *Gammarus marinus*, Leach; 7. *pungens*, n. s. from "les eaux thermales du mont Cassini en Italie."; 8. *Ornatus*, M.-Edw.; 9. *Peloponesius*, Guérin; 10. *campylops*, Leach.

"*aa. Point d'épines sur la portion postérieure de l'abdomen.*" 11. *pulex*, Geoffroy (text, not figure), etc., a species, as Bate and Westwood point out, not agreeing with the character "*aa*," any more than *fluviatilis* agrees with the character "A"; 12. "*Ermannii*," n.s., figured in the Brit. Mus. Catal., pl. xxxii. fig. 7, as "*Crangonyx Ermannii;*" 13. "*Impostii*," M.-Edw.; 14. "*Othonis*," M.-Edw.; 15. *pinguis*, Kröyer.

"AA. *Bord postérieur du troisième anneau de l'abdomen, et en général celui des deux anneaux précédents se prolongeant en arrière de manière à former sur la ligne médiane une grosse dent.*"

This section includes the species "16. *Sabinii*," Leach; 17. *mucronatus*, Say; 18. *appendiculatus*, Say.

"§ 2. *Espèces dont les yeux sont circulaires.*

"B. *Griffe des secondes pates s'infléchissant sur le bord de la main et non sur sa face interne*," with the species;—

19. *loricatus*, Sabine; 20. "*Savii*," M.-Edw., with the notice appended in regard to *Gammarus cautilus*, Müller, Zool. Dan., vol. 3. p. 60. tab. 116, figs. 1–11, that "La CREVETTE TRONQUÉE de Müller ressemble assez à l'espèce précédente, mais s'en éloigne par la grandeur du filet accessoire des antennes supérieures qui paraît être aussi long que leur pédoncule, par le peu de largeur du premier article des pates postérieures, et par la grandeur des lames terminales des appendices abdominaux de la sixième paire."; 21. *podager*, M.-Edw.; 22. *brevicaudatus*, M.-Edw.; followed by the remark that "si le *Gammarus grossimanus* de Montagu était pourvu d'un appendice sétacé accessoire aux antennes supérieures, c'est près de notre Crevette brevicaude qu'il devait prendre place; mais, dans le cas contraire, il rentrerait dans le genre Amphitoé."

"B.B. *Griffe des secondes pates s'infléchissant sur la face interne de la main*," containing only the species, 23. "*Dugesii*," M.-Edw., with the note, "cette espèce présente tous les caractères assignés par M. Leach à son genre MELITE," and followed by the well-grounded suspicion that *Gammarus palmatus*, Montagu, may be the same species.

Ischyrocerus, Kröyer, has the one species, *anguipes*, Kröyer.

Leucothoe, Leach, has only the species *furina*, Savigny, but the description of this is followed by the observation that "le *Gammarus articulosus* de Montagu, d'après lequel Leach a établi le genre Leucothoé ressemble beaucoup à l'espèce précédente, mais est trop mal connu pour que nous puissions y assigner des caractères; Leach dit à la vérité que les antennes ne sont formées que de trois articles, ce qui le ferait distinguer facilement, mais il me paraît peu probable que cette observation soit exacte."

In the "Tribu des Crevettines marcheuses," with slender, semi-cylindrical bodies, not laterally compressed, with narrow side-plates, lower antennæ generally pediform, the palps of the maxillipeds little developed, and the pleon not formed for leaping, he places *Erichthonius*, M.-Edw., with the one species *difformis*, M.-Edw., and the remark that, "le *Gammarus spinicarpus* de Müller se rapproche beaucoup des Erichthonies, mais devra probablement constituer un genre particulier."; *Cerapus*, Say, with the species 1. *tubularis*, Say; 2. *pelagicus*, Leach, to comprise *Cancer fulcatus*, Montagu, and *Jassa pelagica*, Leach. The new genus *Cerapodina* is thus explained;—"Nous rangerons sous ce nom générique

un petit Crustacé qui a été décrit dernièrement par M. Templeton, et qui ressemble beaucoup aux Cérapodes, tant par son organisation que par ses mœurs, mais qui s'en distingue par la conformation des antennes, dont les deux paires se terminent par un filet multi-articulé. Il est aussi à noter que la tête est ici confondue avec le premier anneau du thorax, et que les quatrième, cinquième et sixième anneaux paraissent être dépourvus de pates." The single species is *Cerapodina abdita*, the *Cerapus abditus* of Templeton, which must retain its name, the new genus being only founded on obvious errors in Templeton's description.

The next genus given is *Podocerus*, Leach, with the species, 1. *variegatus*, Leach; 2. *putchellus*, Leach; followed by an observation on the *Podocerus cylindricus* of Say. The genus *Corophium*, Latreille, receives the species, 1. *longicorne*, with the usual synonymy; 2. "*Bonnellii*," M.-Edw. *Atylus*, Leach, has the one species *carinatus*, for the *Gammarus carinatus* of Fabricius. *Unciola*, Say, has the single species, *irrorata*, Say.

The Famille des Hypérines is divided into three tribes. The first, the Tribu des Hypérines gammaroides "characterised by the smallness of the head and the compressed form of the body," includes a single genus, *Vibilia*, M.-Edw., with *Dactylocère*, Latreille, for a synonym, and with one species, *Peronii*, M.-Edw., Pl. 30, fig. 1.

In the second division, the Tribu des Hypérines ordinaires, "le corps est large et renflé; la tête est très-grosse; les antennes de la première paire sont subulées et pointues; enfin celles de la seconde paire sont styliformes et ne peuvent pas se reployer sur elles-mêmes comme chez les Typhis, etc." The genera and species included are as follows:—*Hyperia*, Latreille, identified with *Cancer?* Montagu, *Lancola*, Say, *Hiella*, Straus, and containing the species, 1. "*Latreillii*," M.-Edw., pl. 30, fig. 16; 2. *oblivia*, Kröyer; 3. *Gaudichaudii*, n. s., from Chili, redescribed in the Brit. Mus. Catal., p. 289, and figured as "Lestrigonus Gaudichaudii," with the remark that "it closely resembles *L. exulans*, but may be at once recognized by the distinct armature on the propoda of the gnathopoda." After the numbered species of *Hyperia*, Milne-Edwards observes that "*Hyperia Lesueurii*," Latr., seems to differ from the two preceding species by having two little triangular horizontal plates, instead of the single plate at the distal end of the abdomen; that Say's *Lancola pelagica* agrees essentially with *Hyperia*, but is distinguished from the other species by having the sixth pair of legs much longer than the rest; and lastly, that *Gammarus galba* of Montagu probably belongs to this genus. *Metoecus*, Kröyer, has the one species, "Medusarum," O. Fabr., followed by the remarks on *Talitrus cyaneæ*, Sabine, already quoted in note on Sabine, 1821. *Phorcus*, M.-Edw., has its one species, formerly spelled *Reynaudii*, but here *Raynaudii*, M.-Edw.

Tyro is a new genus instituted to receive *Hyperia cornigera*, M.-Edw., and is thus explained:—"Dans cette petite division générique, la forme générale du corps est la même que chez les Hypéries si ce n'est que la tête est tronquée antérieurement. Les antennes inférieures sont extrêmement petites comme dans les genres précédens, mais celles de la première paire sont plus longues que le corps, et composées de deux articles dont un basilaire très-court, et l'autre terminal styliforme, gros et excessivement long. Aucune des pates n'est préhensile, mais leur longueur est très-inégale; celles de la cinquième paire sont beaucoup plus longues que les autres, et quoique assez fortes, ont leurs deux derniers articles filiformes; les pates de la septième paire sont très-petites et si grêles qu'elles ne paraissent pas être propres à la locomotion. Quant à l'abdomen, sa conformation est semblable à celle des Hypéries, si ce n'est que les fausses pates des trois dernières paires sont tres-grêles, et ne présentent pas à leur extrémité deux lames distinctes." It has been pointed out by Bovallius, 1886, that this genus anticipates *Clydonia*, Dana.

Primno, Guérin, is given with the species *macropa*, Guérin. *Lestrigonus*, M.-Edw., has the species "*Fabrii*," M.-Edw., figured pl. 30. fig. 18., the description being followed by the remark that *Lestrigonus exulans* of Kröyer seems to be intermediate between the preceding

species and the Hyperiæ. *Daira*, M.-Edw., has the species "*Gabertii*," M.-Edw. *Themisto*, Guérin, has the species, 1. "*Gaudichaudi*," Guérin; 2. *arctica*, Kröyer, including *Themisto Gaudichaudii* of Ross and Owen, both being synonyms of *libellula*, Mandt; 3. *crassicornis*, Kröyer, another synonym of *libellula*. *Anchylomera*, M.-Edw., has the species, 1. "*Blossevillii*;" 2. "*Hunterii*," M.-Edw., figured pl. 30. fig. 4, the description being followed by the remark that *Hieracomyx* of Guérin "ne nous paraît pas différer notablement de nos Anchylomères," &c., a view accepted by Spence Bate, who gives Guérin's species as *Anchylomera abbreviata*.

Phrosina of Risso, not Latreille, with *Dactylocera*, Latreille, for a synonym, is next described. A note says, "dans l'espèce que j'ai examinée il n'existait aucun vestige d'appendice palpiforme inséré aux mandibules; mais dans la figure que M. Costa a donnée de ce genre, on voit de chaque côté de la bouche un petit appendice sétacé qui paraîtrait être un palpe mandibulaire, et qui est considéré par ce naturaliste comme une seconde paire d'antennes; il serait possible que ces appendices ne fussent autre chose que les pièces terminales des pâtes-mâchoires devenues plus saillantes que d'ordinaire." To this genus is assigned the species "*Phrosina Nicetensis*," M.-Edw., previously called *Dactylocera Nicetensis*, the description being followed by the remark that "La Phrosine semi-lunaire, à en juger par la figure très-détaillée qu'en a donnée M. Costa, diffère de l'espèce précédente par l'absence d'une grosse dent à l'angle antéro-inférieur du pennltième article des pates antérieures, par la forme plus acuminée des lames natatoires que représentent les trois dernières paires de fausses pates, et par quelques autres caractères." In the synonymy of the species he gives "*Pisitooë bispinosa?* Raffinesque,"—*Phrosine semilunata?* Risso,—Desmarest, Consid. p. 259.—Costa, Fauna, Crust. pl. iv. fig. 1–5.

To *Phronima*, Latreille, he assigns the species, 1. *sedentaria*, Forskal; 2. "*Atlantica*, Guérin, and adds, in regard to *Phronima custos*, Risso, that it is probably the same, although in the figure, given by Risso and copied by Desmarest, the third segment of the abdomen, probably by error of the draughtsman, is without false feet. He thinks that if Rafinesque's *Sperchins* were better known, it would perhaps come near to *Phronima*.

The Tribu des Hypérines anormales is characterized by "un mode de conformation des antennes inférieures qui est très-remarquable; ces organes, au lieu d'avoir la forme d'une tige cylindracée ou d'un stylet peu flexible, et de faire saillie au-devant de la tête, s'insèrent à la face inférieure de celle-ci, sur les côtés de la bouche, et se replient trois ou quatre fois sur eux-mêmes en zigzag." "Voyez Pl. 30, fig. 10."

To this tribe he assigns the following genera and species:—

Typhis, Risso, with the species, 1. *ferus*, M.-Edw.; 2. *rapax*, M.-Edw.; 3. *ovoides*, Risso. He also says "le genre Orione de M. Cocco ne paraît pas différer de celui dont nous faisons ici l'histoire; mais les figures qu' il en a données sont trop grossières pour que nous puissions assigner des caractères aux espèces dont il fait mention." He thinks further that the *Cancer gammarus monoculoides* of Montagu ought probably to be referred to *Typhis*, but this is now known to be an erroneous supposition.

Pronoe, Guérin, has the single species, *capito*, Guérin.

Oxycephalus, M.-Edw., has the species, 1. *piscator*, M.-Edw., figured Pl. 30. fig. 10; 2. *occanicus*, Guérin; 3. *armatus*, n. s., "Tête aussi longue que tout le reste du corps, terminée par un rostre styliforme très-long, renflée au milieu dans le point occupé par les yeux, puis rétrécie dans une étendue assez considérable, et renflée de nouveau à son extrémité postérieure, où se trouve la bouche. Antennes de la première-paire très-petites et terminées par une lamelle ovalaire; celles de la seconde paire extrêmement longues et grêles. Pates des deux premières paires extrêmement petites; le premier article de celles des cinquième et sixième paires étroit et semblable à celui des pates précédentes. Les pates de la septième paire paraissent manquer complètement, mais il existe, au point où elles devraient s'insérer, une

lamelle membraneuse semblable à celle fixée près de la base des pates précédentes. Portion postérieure de l'abdomen très-étroite ; le sixième segment, cylindrique, et terminé par un stylet impair aussi long que le corps. Les fausses pates des trois dernières paires très-grêles, très-longues, et terminées chacune par deux stylets. Longueur, environ 1 pouce." This under the name *Rhabdosoma armatum* became the type of the new genus *Rhabdosoma*, Adams and White, 1848.

The Ordre des Lœmodipodes or Lœmipodes is still described as being without mandibular palp. It is divided as usual into two families. The Famille des Caprelliens, ou Lœmodipodes filiformes, contains the following genera and species :—*Caprella*, Lamarck, with the species, 1. *linearis*, answering to "*Cancer linearis?* Lin. Syst. nat.," etc. ; 2. *acuminifera*, Leach, pl. 33, fig. 1, including *Puce de mer arpenteuse*, Queronic ; 3. *scaura*, Templeton ; 4. *nodosa*, Templeton ; 5. *acutifrons*, for which inaccurately Desmarest is given as the authority, and *Caprella atomos*, Leach, as a synonym ; 6. *phasma*, Montagu ; the description of which is followed by the remarks that *Caprella tuberculata*, Guérin, Iconogr. Crust. Pl. 28. fig. 1, resembles the preceding species by the existence of a cephalic horn, but is distinguished by having a great number of blunt tubercles all along the back, and by the form of the legs of the three last pairs, of which the penultimate joint is widened and armed with a large tooth on its inner edge; "*Caprella mantis*, Latreille, Nouv. Dict. d'Hist. nat.," he says, is very imperfectly known ; *Cancer filiformis*, Linn., Amœn. Acad. t. 6, p. 415, et syst. nat. t. 1, pars 5, p, 2993, probably, he thinks, belongs to this genus.

"*Naupridia*," Latreille, with no described species.

Leptomera, Latreille, with the species, 1. *pedata*, Müller, and 2. *ventricosa*, Müller, which are, as Milne-Edwards suspected, the male and female of the same species properly called *Proto ventricosa*. That *Proto*, Leach, is the same as *Leptomera* is recognised by Milne-Edwards, though he does not give *Proto* its rightful precedence.

In the Famille des Lœmodipodes ovalaires ou Cyamiens he places the single genus *Cyamus*, giving Lamarck, instead of Latreille, as the earliest authority for the name. The species he recognises are, 1. *erraticus*, Roussel de Vauzème, in the synonymy of which he erroneously groups together the various names applied to species of *Cyamus* in writings earlier than R. de Vauzème's treatise ; 2. *ovalis*, R. de V. ; 3. *gracilis*, R. de V., with the concluding observation that "le *Cyamus Delphini* de M. Guérin (Iconographie, Crust. Pl. 28, fig. 5) paraît différer des espéces précédentes par la brièveté des appendices branchiaux, et par la manière dont les divers anneaux du thorax se touchent latéralement."

184–. Milne-Edwards (Editor).

Les Crustacés. Le Règne Animal distribué d'après son organisation, pour servir de base à l'histoire naturelle des animaux, et d'introduction à l'anatomie comparée par Georges Cuvier. *Edition* accompagnée de planches gravées, . . . par une réunion de disciples de Cuvier. Paris, Fortin, Masson et Cie, Libraires, successeurs de Crochard. (No date is given in the work itself ; I understand from Mr. G. K. Forteseue of the British Museum that it appeared in *livraisons* between 1836 and 1849 ; it is sometimes called the Crochard Edition, or the Illustrated Edition.)

Pages 165–188 refer to the Amphipoda.

The Amphipoda, pls. 58 to 61, include under "des Crevettes (*Gammarus*, Fab.)," *Phronima*, Latr. ; *Hyperia*, Latr. ; *Phrosine*, Risso ; *Dactylocera*, Latr. ; *Ione*, ("mais uniquement d'après une figure de Montagu, *Oniscus thoracicus*, Trans. linn. soc. ix. iii., 3, 1"); *Orchestia*,

Leach; *Talitrus*, Latr.; *Atylus*, Leach; *Gammarus*, Latr.; *Melita*, Leach; *Mæra*, Leach; *Amphithoe*, Leach; *Pherusa*, Leach; *Dexamine*, Leach; *Leucothoe*, Leach; *Cerapus*, Say; *Podocerus*, Leach; *Jassa*, Leach; *Corophium*, Latr.; *Pterygocera*, Latr.; *Apseudes*, Leach, (*Eupheus*, Risso); *Typhis*, Risso; *Aceus*, Risso, (*Gnathia*, Leach); *Praniza*, Leach. These form the third order. The fourth order, Læmodipoda, pl. 63, includes under "De Cyame (*Cyamus*, Latr.)," *Leptomera*, Latr. (*Proto*, Leach); *Naupredia*, Latr.; *Caprella*, Lamck.; and for "des cyames proprement dits," *Cyamus*, Latr., (*Laruula*, Leach).

The only part of this work which is of any independent value as regards the Amphipoda is the group of fine plates.

As to "*Dactylocera Nicæensis*, Edw.," pl. 58, fig. 2, the editor says, "Cette espèce ne me paraît pas différer de celle désignée par M. Risso sous le nom de *Phrosina semilunata*, et citée par M. Latreille comme type de son genre Dactylocère; cependant elle ne présente pas les caractères assignés par notre auteur à ce même genre."

On "*Jone thoracicus*, Latr.," pl. 59, fig. 1, he says, "il suffit de comparer ces figures d'une part avec celles des Talitres et des autres Amphipodes proprement dites, et de l'autre part avec celles des Cymothoés, etc. (Pl. 65), pour se convaincre que ce n'est pas ici la place naturelle du genre Jone; dans la classification adoptée dans mon Histoire Naturelle des Crustacés, ces parasytes sont rangés dans une division particulière de l'ordre des Isopodes à la suite des Cymothoadiens."

Bate and Westwood, i. p. 19. n., consider that the representation of *Talitrus saltator*, Edw., pl. 59, fig. 2.a., has in reality been taken from *Talitrus Beaucoudraii*, Edw.

The mandible of *Orchestia littorea*, pl. 59, fig. 2.d., seems to show a rudiment of a palp, but unjointed.

"*Orchestia Quoyiana*," Edw., pl. 59, fig. 4, is clearly depicted.

"*Gammarus Dugesii*," Edw., pl. 60, fig. 3, has the remark, "Cette espèce offre un exemple de la forme des mains de la deuxième paire, qui est caractéristique du genre *Melita* de Leach. Genre qui ne paraît pas devoir être adopté." It is in fact a synonym of *Melita palmata*, Montagu, the type-species of Leach's genus.

"Pl. 60. Fig. 4. Gammarus brevicaudatus, Edw. Individu mâle. Ici la main de la deuxième paire offre les particularités de forme propres au genre *Mæra* de Leach. "Fig. 4. a. Patte de la seconde paire chez la femelle, conformée de la même manière que chez les Crevettes ordinaires." These are the two sexes of *Gammarella brevicaudata*. On fig. 5. *Melita palmata*, Leach, he says, "Ce genre, comme nous venons de le dire, ne paraît pas être admissible." Fig. 6. "*Amphithoe Marionis*," Edw., is identified by Spence Bate with *Dexamine spinosa*, Montagu.

Pl. 61. fig. 4, "*Podocerus variegatus*, Leach," "d'après l'individu décrit par Leach et conservé dans le Muséum Britannique," has the last peræon-segment and the first of the pleon dorsally produced backwards in a very marked tooth-like process.

Pl. 62 bis, is devoted to *Typhis ovoides*, Risso, and *Typhis ferus*, Edw.; pl. 63 to *Caprella linearis*, *Leptomera ventricosa*, and to *Cyamus ovalis*, Roussel de Vauzème.

1841. Delle Chiaje.

Descrizione e notomia degli animali invertebrati della Sicilia citeriore. Napoli, 1841. 5 vols. folio.

Bate and Westwood, ii. p. 27, refer to plate xxiii. of this work as containing a figure of *Doliolum papillosum*, Delle Chiaje, with *Phronima sedentaria* inside it. Claus, 1862, makes a similar reference. Bate and Westwood, *loc. cit.*, also refer to Otto, "Nova Acta," xi. p. 313, and Otto is referred to by Claus likewise.

1841. Eichwald, Eduard von, born July 4, 1795 (Hagen).

Fauna Caspio- caucasia nonnullis observationibus novis illustravit Eduardus Eichwald. Cum Tabul. lithograph. XL. Petropoli, MDCCCXLI.

At page 225, under "Crustata," he says, "Inter caspii maris et nigri incolas e *Crustatorum* classe similis quoque ac inter Pisces intercedit differentia; in hoc scilicet propter maris communionem cum mediterraneo alia deprehenduntur genera aliæque prorsus species, quam in illo; sic ad Ponti incolas pertinent inter alia complura *Pagurus Diogenes Riss.*, *Pisidia longicornis Leach.*, *Xantho rivulosus Riss.*, . . . aliique; porro *Orchestia littorea Leach*, *Gammarus locusta Leach.* aliique, *Anthiæ* dein et *Hyalæ*, duo Amphipodum genera nova, *Amphithoæ*, *Idotheæ* . . . multaque alia, a cel. *Rathke* fusius descripta et a caspio mari plane aliena; alia denique in utroque mari offenduntur, quibus potissimum *Astaci* pertinent." For the "duo Amphipodum genera nova," he refers to Rathke, *zur Fauna der Krym*, 1837, so that for *Anthiæ* we should probably read *Amathiæ*. His own descriptions of Amphipoda are as follows:—

"Gammarus Caspius Pall. Reise durch Russland I. Petersb. 1801, pag. 477.

"Segmenta caudalia in dorso mucronata, postrema duo stylo dorsali mutico notata et appendice utrinque cylindracea bifurca, interjecto insuper medio foliolo lineari, primi paris pedibus minutis, secundo et tertio cheliferis, reliquis retrorsum versis.

"Hab. in caspio mari, ad ostium Rhymni una cum *Gammaro pulice Fabr.*, ad insequentem fortasse speciem referendo.

"Gammarus Hæmobaphes *m.* Tab. xxxvii. Fig. 7. *a. b. c.*

"E fusco- viridis, segmentorum singulorum postico margine extremo laterali purpureo- sanguineo.

"Hab. in mari nigro; in caspio adesse quoque videtur.

"Corpus vix 4 lin. longum; antennis ac pedibus omnibus et appendicibus caudalibus ciliatis.

"Inter antennas capiti parvo intixas muero compressus nullus, quo itaque recedit a *Gam. cancello Pall.*, (Spicileg. Zoolog. Fasc. IX. Berol. 1772 Tab. III. fig. 18.) cui in ceteris quoad antennas simillimus; priores tres articuli (pedunculus) superiorum antennarum G. *hæmobaphis* breves, articuli vero flagelli multo minores, minimi, numerosissimi; priores dein articuli duo inferiorum antennarum multo longiores, saltem duplo longiores illis superiorum, at minus numerosi articuli flagelli inferiorum ideoque hæ multo breviores superioribus, licet paullulum crassiores iis, non ut in *Gamm. locusta Pall.* antennæ superiores multo breviores inferioribus. *Gammarus locusta*, a cel. *Rathke* descriptus (l. c. 373) fortasse ad hanc pertinet speciem, exceptis tamen antennis, quas superiores parum tantum longiores dicit inferioribus.

"Oculi viridi-nigri, semilunares.

"Squamæ segmentorum pectoralium laterales sive laminæ ab his segmentis diremptæ pedesque contegentes volumine conspicuo notabiles; quarta lamina omnium reliquarum latissima, maxima, post eam tres aliæ minimæ, quasi rudimentariæ; numerus earum in universum illi pedum respondet, ut itaque septem segmenta pectoralia laminas ibidem laterales adjunctas et a media parte disjunctas monstrent; reliqua abdominalia segmenta genuina simplicia.

"Cauda sensim latitudine increscens, postrema duo segmenta exigua aculeis in dorso prædita ultimumque sursum conversa spina apicali. Sub hac caudæ extremæ parte subtus infixi spurii pedes breviores, apice bifidi versusque anteriora elongati alii.

"Pedes pectorales 7, antici duo tarsis latioribus instructi, tarso secundi pedum paris (l. c. *b.*) latiore, longiore, quam ille prioris (l. c. *a.*) subtusque hispido- aculeato; primi quoque paris pedum tarsus hispidus, at minus aculeatus, reliquorum instar; omnesque reliqui tertii instar (l. c. *c.*) pedes hispiduli; in *Gammaro locusta* duo pedes antici tarsis subæqualiter latis longisque instructi; tales quoque in nostro balthico.

"Carnivorus cancellus retia corrodit et forsitan fulgorem maris pontici (an quoque caspii?) nocturnum efficit; constat enim observationibus, *Gammarum locustam* nocturna luce splendere in germanico mari. (v. *Desmarest* considerations générales sur la classe des *Crustacés*, Paris 1825 pag. 267)."

Boeck thinks that this *Gammarus hæmobaphes* is much the same as *Gammarus locusta*. Spence Bate does not notice it in the Brit. Mus. Catalogue.

1841. Gould, Augustus Addison, born April 23,1805, died Sept. 18, 1866 (Encycl. Brit., 9th Edition).

Report on the invertebrata of Massachusetts, comprising the Mollusca, Crustacea, Annelida, and Radiata. Published agreeably to an order of the Legislature, by the Commissioners on the zoological and botanical survey of the State. Cambridge, 1841.

The Crustacea occupy pages 321–341. At page 333 the account of the "Amphípoda" begins, followed by that of the "Lœmípoda." The following notes are given :—

"Genus Orchéstia, Leach. O. longicórnis. Tálitrus longicórnis, Say; *Journ. Acad. Nat. Sc.*, i. 384. This appears to be the same as *Cancer gámmarus saltàtor* of Montagu (*Trans. Lin. Soc.*, ix. 94, tab. 4, f. 3,) which is given as synonymous with *Tálitrus locústa* of Lamarck, Pennant, and others. But it is not *Gámmarus locústa* of Montagu.

"O. gryllus. Tálitrus gryllus, Bosc; *Hist. Nat. des Crust.*, ii. 104. Say; *Journ. Acad. Nat. Sc.*, i. 386. The following seem to be synonyms, viz. Tálitrus gamaréllus, Latr. and Lam. Orchéstia littorèa, Leach; *Trans. Lin. Soc.*, xi. 356. Desm.; *Consid.*, &c., 261, pl. 45, f. 3.

"Genus Gammarus. G. locústa, Montagu; *Lin. Trans.*, ix. pl. 4, f. 1. Milne-Edw.; *Ann. des Sc. Nat.*, xx. 367. This is not *G. locústa* of Pennant, Gmelin, Pallas and Fabricius, which is a *Tálitrus*.

"G. minus, Say; *Journ. Acad. Nat. Sc.*, i. 576. Found in ditches and sluggish fresh water, adhering to sticks.

"Two or three other species of Orchéstia, and one of Amphíthöe, remain undetermined.

"Genus Hypèria, Latr. H. Galba. Gámmarus Galba, Montagu; *Lin. Trans.*, xi. pl. 2, f. 2. The following are doubtless synonyms: *Oníscus medusàrum*, O. Fabr.; *Fauna Groenl.*, 275. Hypèria Sueurii, Latr. Hypèria Latréillii, Milne-Edw.; *Ann. des Sc. Nat.*, xx. 388, pl. 11, f. 1–7. This curious animal is found in the pouches of the Medusæ or *Sun-fish* as they are commonly called. Whether they make this their home, or whether they become entrapped there or not, it would be difficult to determine. They seem, however, to be quite at their ease in this situation.

"Another animal with long, many-jointed antennæ, was found in company with the above, which belongs either to the same genus, or to the genus Hieraconyx.

"Lœmípoda. Genus Cyamus, Latr. C. ceti, Latr.; Gen., i. 60. Desm.; *Consid.*, 280, pl. 46, f. 4. Edwards; *Ann. des Sc. Nat.*, 2d Series, iii. 328, pl. 64, f. 13, 14. Oníscus ceti, Lin.; Mull. Larúnda ceti, Leach. The whale-louse may be properly enumerated among our Crustacea, as it is found on the whales which are occasionally caught on our coast. It varies in form, according to its degree of development.

"Genus Caprélla, Lam. I have observed two species of this curious genus, neither of which can I refer to any described species. One of them is very delicate, about half an inch long, with no spines upon any part, that I can discover, and having its back thickly dotted with dark green.

"The other is an inch in length, entirely crimson except its black eyes. The head is blunt, the lower antennæ ciliated and extending to the second segment, and the upper ones to the third segment; first two segments nearly as long as the three next, and about one-third of the whole length; on the middle of the first is a spine; two last segments short and heart-shaped. Hands having a long curved finger; an imperfect thumb on the second pair of legs; a tubercle at the base of the ovate carpus, and a small spine at the middle. This might be called C. *sanguinea*, from its colour, which it retains in spirit.

"These curious animals are found among clusters of zoophytes and delicate sea-weeds. Their mode of walking is like that of some caterpillars, who bring the tail forward to the head and then thrust the body forward its whole length to prepare for another step."

Mayer, 1882, considers that the descriptions of *Caprella sanguinea* given by Gould and Stimpson leave the species indeterminate.

1841. Koch, C. L. See Note on Koch, 1835.

1842. Goodsir, Harry D. S., lost in Sir J. Franklin's Expedition of 1845.

On a New Genus, and on Six New Species of Crustacea, with Observations on the development of the Egg, and on the Metamorphoses of Caligus, Carcinus and Pagurus. The Edinburgh New Philosophical Journal. Vol. xxxiii. Edinburgh, 1842. pp. 174–192. Pl. 3.

The pages 363–368 of this volume by the same author, though mentioned in Boeck's list, do not refer to the Amphipoda. Under the title above given, Section IV. is "*On the Structure and Habits of the Caprellæ; with descriptions of some new Species.*"

Goodsir gives a short account of the circulation of the blood in the *Caprellæ*, describes the ovaries, and in regard to the process of exuviation says that the skin "bursts behind the head in a transverse direction, and also down the mesial line of the abdominal surface." He speaks of their being little known, owing "firstly, to their pelagic habitats," and further on says, "they are in general local in their habitats, frequenting coralines which are found in deep water." As a matter of fact, the Caprellidæ have a very extensive distribution, and may be found in great profusion between tide-marks. The species which he describes and figures are:—

Caprella spinosa, of which he says. "this species differs from the *Caprella* Phasma of Colonel Montagu in having five spines on the first thoracic segment, and from the segments being considerably longer. The third joint of the superior antennæ is very much longer, and the first pair of feet are also minute and slender, differing in so far from those of *Phasma*, which are strong and powerful. The inferior edge of the last joint of the second pair of feet is also armed with two strong spines, whereas in *Phasma* there is only one strong spine." It is nevertheless identified by Mayer with *Protella phasma* without hesitation, in accordance with the opinions of Bate and Westwood, and of Boeck.

Caprella tuberculata, the full description of which is followed by the remark, "This species is apt to be confounded with the *Caprella acanthifera* of Leach, but may be distinguished from it by the double fringe of spines on the lower edge of the inferior antennæ; the superior antennæ are also much shorter than those of the *acanthifera*."

Caprella lævis, of which he says, "this species may be distinguished from *Caprella linearis*, with which it is most apt to be confounded, by its greater comparative size, the structure of the antennæ; by the shortness of the post-occipital segment; the situation of the swelling on the first thoracic segment, which is at the posterior edge, whereas in the *linearis* it is at the

anterior; the femoral joint of the second pair of legs is not clavate in the *linearis*, and is also quite straight."

Caprella linearis, after describing which he says, "this appears to be the *Caprella linearis* of authors; there are some marks of difference, but they are trivial, and not sufficient to authorize any new specific distinctions."

Of these last three species, Mayer remarks, "Goodsir's species *C. lævis* and *C. tuberculata*, were referred by Boeck to *C. linearis* and *C. septentrionalis*, the second was referred by Bate to *C. acanthifera*; I refer them both to *C. linearis*, that is, to *C. lobata*, Kröyer, var. *a* and var. *γ*, leaving it on the other hand undecided, whether Goodsir's *C. linearis* has anything in common with the Linnæan species." In a note Mayer observes that Goodsir rightly distinguished his *Caprella tuberculata* from *Caprella acanthifera*, Leach, by the double fringe of spines on the lower edge of the inferior antennæ. The name *Caprella tuberculata* was preoccupied by Guérin, whose species is most probably distinct from Goodsir's.

1842. White, Adam, born April 29, 1817, died 1879. Doubleday, Edward, born Oct. 9, 1810, died Dec. 14, 1849 (Hagen).

Gray, John Edward, (*Editor*), born 1800, died March 7, 1875 (Encycl. Brit., 9th Edition).

Fauna of New Zealand.

List of the Annulose Animals hitherto recorded as found in New Zealand, with the Descriptions of some New Species by Messrs. Adam White and Edward Doubleday, Assistants in the Zoological Department of the British Museum.

In the "Class Crustacea" only 29 species are here included, with only 2 Amphipods, "*Talitrus brevicornis*, M. Edw. Hist. Nat. des Crust. iii. p. 15," and "*Orchestia Quoyana*, M. Edw. iii. p. 19."

1842. Guérin-Méneville, F. E.

Description d'un Crustacé amphipode formant un genre nouveau dans la famille des Hypérines. Revue zoologique, par la Société Cuvierienne; association universelle pour l'avancement de la zoologie, de l'anatomie comparée et de la paléontologie; Journal mensuel. Paris, 1842. Juillet, 1842. pp. 214–216.

The giant Amphipod here described is closely allied to one which was among the first prizes of the Challenger dredgings, and which, owing to the comparatively scanty supply of literature available on board, was considered to be of a new genus, receiving the title *Thaumops pellucida*. Guérin says:—

"La famille des Hypérines se compose aujourd'hui de 15 genres, tous formés avec des Crustacés de petite taille. En voici un que l'on peut regarder comme un géant dans sa famille, car il est cinque ou six fois plus grand que les plus grandes espèces connues. Ce genre devra être placé entre nos *Themisto* et les *Daira* de M. Edwards, dans le groupe formé avec les Hypérines qui n'ont qu'une paire d'antennes; voici ses caractères essentiels:

"Genre Cystisoma.—Deux antennes seulement, composées de trois articles. Pattes des première et seconde paires terminées par une petite pince à doigt mobile un peu plus long que le doigt immobile, terminé par un petit ongle articulé à son extrémité. Les autres pattes allongées, grêles, aplaties; les troisième et quatrième augmentant graduellement de longueur. Pattes des quatrième cinquième et sixième paires munies à leur base d'une large

plaque respiratoire arrondie et aplatie. Les trois premiers segments de la queue ayant chacun en dessous une paire de fausses pattes assez grandes, formées d'une tige terminée par deux lames. Quatrième et cinquième segments plus petits, munis chacun, en arrière, d'une paire de fausses pattes allongée, portant au côté externe une petite lame articulée et formant une large nageoire postérieure. Corps très globuleux, vide en dedans comme une vessie, allant ensuite en diminuant jusqu'à l'extrémité postérieure, tête fort grosse et presqu'entièrement occupée par les yeux."

"Comme on peut le voir par l'exposé de ces caractères, ce genre se distingue des *Daira*, dont il est voisin, par les pattes très-inégales, et des *Themisto* par l'absence des antennes inférieures. On ne peut non plus le confondre avec les *Primno*, car ceux-ci n'ont pas les pattes antérieures terminées en pince.

" *Cystisoma Neptunus*. (Voy. notre pl. 1, fig. 1.) Tête et corps vides, gonflés comme une vessie. Tête plus large que le Thorax, ayant de chaque côté et un peu inférieurement une rangée d'épines partant de l'insertion des antennes en avant, et se terminant au bord postérieur près de la bouche : une seconde rangée très-courte, formée de petites épines, de chaque côté de la bouche en dessous. Thorax formé de six segments apparents ; le premier et le second réunis, portant les deux premières paires de pattes : segments du thorax offrant au milieu, en dessus, une carène assez aiguë avec deux petites épines, et présentant de chaque côté au premier segment, et au bord postérieur seulement aux autres, une ligne transversale de petits tubercules. Segments abdominaux également carénés au milieu. Pattes armées de petites dents sur leur tranche interne.—Long. 9 cent. (3 pouces 4 lignes), Larg. de la tête, 2 cent. 1/2.—Hab. le grand océan Indien. Ce precieux Crustacé nous a été donné par M. Petit de la Saussaie."

Guérin's species is called *Thaumatops Neptunus* by Bovallius, 1886, but it should in my opinion be named *Cystisoma spinosum*, J. C. Fabr. See Notes on Fabricius, 1775, and Bovallius, 1886.

1842. KRØYER, H. N.

Nye nordiske Slægter og Arter af Amfipodernes Orden, henhørende til Familien *Gammarina*. (Foreløbigt Uddrag af et større Arbejde). Naturhistorisk Tidsskrift. 4de Binds 2det Hæfte. (Med to Tavler). Kjøbnhavn. 1842. pp. 141–166.

Kroyer, who had himself visited Spitzbergen and the north of Norway, and likewise for a time resided within the tropics, here brings forward arguments against the application to the Amphipoda of the supposed law in zoological geography, that animal life is more vigorously developed progressively from the Poles to the equator. He finds it inapplicable to these Crustacea and some other inhabitants of the sea, whether we regard variety of forms, numbers of individuals, the size they attain, or the brilliance of their colouring. He says, "on a glass bottle, with a little Amphipod, not an inch long, which was sent to the Royal Museum, the sender has written, 'with this Crustacean Godthaab Bay was filled to such an extent on the 11th of July 1841, that in several places it was impossible to see through the water.' The small creatures, which are known to fishermen under the name of *Tanglopper*, and which likewise belong to the Amphipoda, are so numerous off Greenland, that in a single night they can consume the largest seal, so that nothing but the skeleton remains." He then gives Hollboll's often-quoted experience of hauling up masses of this abundant and voracious species of *Anonyx*, by means of bait in an open basket. The Crustacean from Godthaab Bay he names *Themisto arctica*, Kr. Where species are common to Spitzbergen, Greenland and the coast of Norway, he finds that they diminish in size the further south they are found. *Caprella septentrionalis*, he

says, is the largest species of its genus. He further illustrates his point by reference to the considerable size of the northern Amphipods, "*Anonyx lagena, Amphitoe Edwardsii, Gammarus Sabini, Gammarus Locusta* and above all *Gammarus loricatus*, of which," he says, "I possess an individual from Spitzbergen, of a length of more than two inches." On the whole, he concludes that the colder seas may be regarded as the true and proper home of the Amphipoda.

He proceeds to define several new genera as follows:—

1. *Opis*:—"Pedes primi paris *chelis* armati portentosæ magnitudinis. Reliqua cum genere *Anonyce* conveniunt." The type species is given as *Opis Eschrichtii* Holbl." The generic name being preoccupied has been changed to *Opisa* by Boeck.
2. *Stegocephalus*:—"*Epimera* insignis magnitudinis, loricam efficientia, sub qua latent membra. *Caput* maximum, quasi proboscideum, epimeris omnino fere tectum, *oculis*, ut videtur, destitutum. *Antennæ* breves (capitis altitudine non longiores); superiores pedunculo crassissimo, flagello appendiculari minimo, uniarticulato; inferiores subpediformes. *Mandibulæ* palpo instructæ brevissimo, crasso, uniarticulato, dentato, parum mobili; pedes maxillares quasi pedunculati; labrum maximum. *Pedes* primi et secundi paris manibus subcheliformibus destituti. Pedes quinti paris pedibus tertii quartique paris structura et directione similes." Spence Bate corrected the error of attributing a palp to the mandibles, as indeed Kroyer had himself done tacitly in the figures of *Stegocephalus inflatus*, in the Voyage en Scandinavie, &c. The type species, *Stegocephalus inflatus*, as also pointed out by Spence Bate, is the same as *Cancer ampulla*, Phipps.
3. *Phoxus*:—"*Caput* permagnum (quintam ferme longitudinis animalis partem efficiens), triangulare, depressum, antice productum et acuminatum. *Antennæ* superficiei capitis inferiori adfixæ, alterum par anterius, alterum posterius, utrumque validum, pedunculo crassissimo. Antennæ *anteriores* perbreves (capite breviores), flagello appendiculari insolitæ magnitudinis ornatæ; pedunculus flagellis longior. Antennæ posteriores parum anterioribus longiores. Mandibulæ sat magnæ, palpo longissimo. Pedes primi et secundi paris manu subcheliformi armati valida; pedes tertii qvartique paris manu qvoqve qvasi muniti subcheliformi, cujus palmam præbent articulus tertius qvartusque juncti, ungvem qvintus sextusqve; sextum pedum par ceteris multo longius. Flagellum pedum fere filiforme. Epimera permagna, margine inferiori setis sat longis instructa. Appendix caudalis laminis constans duabus." For this genus Kroyer says Captain Holboll had proposed the unsuitable name *Spinifer*, distinguishing two species, *Spinifer spinosissimus* and *Spinifer flagelliformis*, which Kroyer unites in his type species *Phoxus holbölli*. The other new species, given as "*Phoxus plumosus* Holbl," Kroyer afterwards thought should form a new genus, an opinion acted on by Boeck, who, ever ready to make new genera, instituted the genus *Harpina*, a preoccupied name, which he changed into *Harpinia*. J. Sp. Schneider, 1884, calls attention to the fact that in Boeck, 1876, fig. 1 on pl. viii., does not represent *Harpinia plumosa*, though it is so named.
4. *Pontoporeia*:—"Antennæ validæ, subpediformes, pedunculo crasso, elongato. Flagellum appendiculare antennarum superiorum perpusillum. Instrumenta cibaria brevia sed lata. Pedes primi et secundi paris perbreves, robusti, illi manu lata instructi, ungve vero breviore; hi manu carentes, ungveque præditi rudimentario. Pedes tertii qvartique paris longiores, validi, subcheliformes, articulo qvarto dilatato palmam efficiente, ungve armati conico, aculeato. Pedes qvinti et sexti paris recurvi, articulo primo parum modum dilatato, ungve armati pusillo. Pedes septimi paris recurvi, articulo primo permagno, clypeiformi; articulo sexto vel ungve fere rudimentari. Epimera magna, margine inferiore plurimis instructo setis plumosis (epimero excepto septimo). Pedes natatorii sat breves, ceteroquin forma vulgari; pedes saltatorii multis armati aculeis." The type species is *Pontoporeia femorata*, Kr.

5. *Pardalisca* :—"Caput crassiusculum, subtumidum. Epimera exiguæ magnitudinis. Antennæ pertenues, superiores flagello instructæ appendiculari ; pedunculus antennarum inferiorum pedunculo superiorum duplo ferme longior. Mandibula apice dilatata, quadridentata, palpo triarticulato. Palpus maxillarum posterioris paris articulo terminali valde dilatato, cordiformi. Pedes maxillares unico instructi laminarum terminalium pari, palpoque quadriarticulato. Pedes primi secundiqve paris ea sunt conformatione, ut quartus eorum articulus manum efficere videatur, quintus sextusque juncti ungvem quodammodo præstent ; ita tamen, ut sextus formam monstret ovalem, multisque armatus sit aculeis marginalibus. Pedes tertii quartique paris ungve sublaminari, postice subtiliter serrulato. Pedes reliqvi elongati, sat debiles, femoribus subangvstis. Pedes spurii primi, secundi et tertii paris natatorii, reliqvi saltatorii." The type species is *Pardalisca cuspidata*, Kr.
6. *Protomedeia* :—"Annuli thoracici latiores qvam altiores, dorso subdepresso. Antennæ superiores pedunculo elongato (flagello parum breviori) instructæ, flagelloque appendiculari multiarticulato. Antennæ inferiores pediformes, pedunculo longissimo-, flagellum ter ad minus longitudine superante. Pedes secundi paris parvi, manu non instructi subcheliformi. Pedes tertii quartique paris sat magni ; articulus eorum quintus sextusque qvasi in ungvem longissimum sunt coaliti, qui cum articulo tertio quartoqve manum qvodammodo efficere videtur prehensilem. Epimera sat brevia. Pedes spurii quarti, quinti et sexti paris saltatorii." In this description Boeck notices that the expression, "pedes secundi paris parvi, manu non instructi subcheliformi," is a slip of the pen for "pedes primi paris etc," which has led subsequent authors astray. The type species is *Protomedeia fasciata*, Kr.
7. *Ampelisca* :—"Pedes primi secundiqve paris nulla instructi manu subcheliformi ; pedes tertii qvartique paris forma peculiari, manu qvodammodo muniti, cujus qvasi palmam efficit articulus tertius, digitum vero qvartus, quintus et sextus juncti ; sextus articulus sive ungvis longissimus gracillimusque ; pedes qvinti sextique paris articulis modo compositi quinqve, quorum ultimus ad finem marginis posterioris ungve armatus est rudimentari, recurvo, immobili (vel parum mobili). Septimum pedum par ungve laminari, lato, natatorio (?). Antennæ graciles, pedunculus inferiorum pedunculo superiorum multo longior. Oculi simplices (?). Pedes maxillares palpo sat brevi. Epimera magna, paria quatuor anteriora multis ornata marginis inferioris setis. Sextum pedum abdominalium par natatorium. Reliqva ferme ut in genere Amphithoes." The type species is "*Ampelisca Eschrichtii*," Kroyer.
8. *Photis* :—"Corpus sat altum, compressum. Antennæ subpediformes (♂ : elongatæ, sat validæ, pedunculo flagellis pauciarticulatis multo longiori), flagello appendiculari destitutæ. Pedes primi et secundi paris sat breves, validi, manu subcheliformi armati robusta. Pes quinti paris recurvatus, inversus, ungve rudimentari. Epimera permagna ; quinque paria anteriora ad marginem inferiorem setis sat longis instructa ; quintum eadem est ac qvartum altitudine, postice profundius excisum. Lamina terminalis interior pedis saltatorii tertii paris rudimentaris." Boeck points out that this genus is omitted from the British Museum Catalogue. The type species is "*Photis Reinhardi*, Kr."
9. *Oediceros* :—"Frons in rostrum producta plus minus acutum obtusumve, semper vero nodo pellucente, ovali, flavo rubescente turgidum. Oculi nulli? Pedunculi antennarum longi, superiorum flagelli longitudinem æquantes vel superantes ; antennæ superiores flagello appendiculari destitutæ. Pedes primi et secundi paris manu armati subcheliformi permagna. Pedes tertii quartique paris validi, ungve instructi lato, laminari ; qvod qvoque usu venit qvinto sextoqve pari, quorum coxa vel articulus primus dilatatus non est. Pedes septimi paris longissimi, tenues, fere filiformes (coxa vel primo articulo excepto). Epimera mediocris magnitudinis multis longisque armata setis marginis inferioris simplicibus ; margo posterior quarti paris integra (non sinuato-excisa)." The type species is *Oediceros saginatus*, Kr.
10. *Lafystius* :—"Caput depressum, latius quam longius, rostratum. Antennæ sat breves,

subulatæ, validæ (superiores validissimæ), eadem ferme pedunculi et flagelli longitudine, subrostro in eodem plano positæ, alterum par anterius alterum posterius. Oculi in superficie capitis dorsali siti. Mandibulæ angustiores, acuminatæ, palpo instructæ; lamina maxillæ prioris exterior nullis divisa articulis; pedes maxillares palpo biarticulato. Thorax latus, depressus. Pes primi paris gracillimus, manu lineari, ungue elongato; pes secundi paris brevis, validus, manu quadrata, ungue sublaminari apice setoso. Reliqui decem pedes validi, subcheliformes, eadem ferme longitudine. Epimera mediocris magnitudinis, quartum par in acumen inferne productum. Pedes natatorii elongati, pedes saltatorii debiles." The type species is "*Lafystius Sturionis*, Kr.," at the time the species was constituted the only one of the Gammarina known to be parasitic.

Under the heading "new species of known genera," Kroyer here alters Milne-Edwards' definition of *Leucothoë*, Leach, to embrace two new species which he describes, *Leucothoë clypeata*, Kr., from Greenland, and *Leucothoë glacialis*, Kr., from Spitzbergen. These, he thinks, if refused admission to *Leucothoë*, would require, not simply one, but two new genera for their reception. He rightly observes that every genus founded on a single species must be liable to modification in its form to include subsequent discoveries. His own two species are now included in Boeck's genus *Metopa*, of which *Leucothoë clypeata* is the type. He describes *Gammarus dentatus*, n. s., by Sp. Bate named *Megamœra dentata*, and by Boeck transferred to *Melita dentata*. He reluctantly admits the separation of *Acanthonotus*, Owen, from *Amphithoë*, excluding from it *Acanthonotus nordmannii*, Milne-Edwards, which Spence Bate gives as *Protomedeia nordmannii*. Kroyer adds a new species *Acanthonotus inflatus*, very near to *Oniscus serratus*, O. Fabr., but "with back rounded, not dentate." These two by Boeck are named *Acanthonotozoma inflatum* and *Acanthonotozoma serratum* respectively, Owen's generic name and White's alternative for it, *Vertumnus*, being both pre-occupied. Kroyer next re-describes *Ischyrocerus anguipes*, adding a new species *Ischyrocerus latipes*, both of which belong to the older *Podocerus* of Leach, and *Ischyrocerus anguipes* in Bate's opinion certainly, in Boeck's doubtfully, being a synonym of *Podocerus cylindricus*, Say. The new species "*Podocerus Leachii*" here described was afterwards called "*Cerapus Leachii*" by Spence Bate, and *Cerapus difformis* by Boeck. To this last S. I. Smith restores its original name *Erichthonius difformis*, Milne-Edwards. Kroyer notices that the male of his species is an *Erichthonius*, for which reason he makes that genus yield as a synonym to *Podocerus*. In the genus *Anonyx* he notes that his *Anonyx appendiculosus* is only the male of *Anonyx lagena*. He has also discovered, he says, that in this genus the males are distinguished from the females in that the antennæ, besides being considerably longer in the lower pair, are furnished with a number of small appendages, which seem to act as suckers (Sugeskaaler), by which probably the male holds the female fast. These had been already noticed by Milne-Edwards in 1830 on his *Gammarus ornatus*. They have since, at Stimpson's suggestion, been called *calceoli*; it is now known that they are not in all species confined to the male sex, or to the lower antennæ, and as they are sometimes found in both sexes, Kroyer's explanation of their use is thought untenable. He finds a similar distinction between the sexes in his new genera *Opis*, *Phoxus* and *Ampelisca*, considers that *Amphithoë crenulata* and *Amphithoë inermis* should on this ground be considered male and female of the same species. These are united by Boeck under the name *Pontogeneia inermis*. He attributes his discovery indirectly to Captain Holböll, his suspicions being aroused by the great number of the species to which Holböll gave names. Of these Kroyer paired "*An. scletator*" with its female "*An. Kröyeri*," "*An. velatus*" with "*An. ornatus*," "*An. Eschrichtii*" with "*An. bonæ spei.*," names of undescribed species which do not re-appear. In a note he expresses a regret that Milne-Edwards did not retain *Atlibrotus chauseicus* in the genus *Lysianassa* and transfer *Lysianassa costæ* to the genus *Anonyx*.

The second portion of the paper deals with the genus *Tanais*, Milne-Edwards, describing the new species *Tanais savignyi*, *Tanais edwardsii*, *Tanais dubius*, *Tanais gracilis*, *Tanais tomentosus*, *Tanais örstedii*, *Tanais cavolinii*.

1843. Krøyer, H. N.

Om *Cyamus Ceti* (med et Par Bemærkninger, betræffende den mulige Anvendelse af de paa Hvalerne levende Smaadyr ved Hvalarternes Adskillelse). Naturhistorisk Tidsskrift. Ser. 1. B. IV. pp. 474–489.

Kroyer says that both Roussel de Vauzème and Milne-Edwards took it for granted that the "*Pediculus Ceti*" of Martens, and the "*Oniscus Ceti*" of Linnæus, must be the same as one of the three species brought home by the former of these two authors. R. de Vauzème thought that his *Cyamus ovalis*, as being the commonest, must be identical with *Cyamus ceti*. But the differences are, in fact, so striking that Milne-Edwards chose *Cyamus erraticus*, R. de V., for identification with *Cyamus ceti*. Krøyer therefore gives full accounts of "*Cyamus Ceti* Linn. (Tab. V. Fig. 63–70)" and "*Cyamus erraticus* (Tab. V. Fig. 71–76)," to show how distinct they really are. He thinks it probable that the distinctions between species of *Cyamus* may be of use in distinguishing the species of whales which they infest, different species of whales having one or more different species of *Cyamus* or some other peculiar parasite upon them. Lütken expresses his surprise that Krøyer, while correcting the errors of others, and offering the ingenious suggestion just mentioned, should have himself made the mistake of supposing that there was only one northern species of whale-louse, and not have recognised that the forms described by Martens and Abildgaard were different species from that which Otto Fabricius had before him. Lütken cannot understand how Krøyer came to ignore the article on *Cyamus* in the "Zoologia Danica," and points out his error in attributing the habitat of Marten's whale-louse to the long-armed Fin-whale, *Balænoptera longimana* (Krepokaken), while affirming that no *Cyamus* has been found on "Balæna Mysticetus," the northern *Skathay*, *Rethval*, or *Right-Whale*, to which, in fact, the *Cyamus ceti* described by Krøyer, the *Cyamus mysticeti* of Lütken, undoubtedly belongs.

1843. Krøyer, H. N.

Beskrivelse af nogle Arter og Slægter af Caprellina; med indledende Bemærkninger om *Læmodipoda* og deres Plads i Systemet. Naturhistorisk Tidsskrift. Ser. 1. Bd. IV. pp. 490–518. 585–616. Pl. VI. VII. VIII. 1843.

After remarking on various mistakes and improvements made by his predecessors in the classification of the Læmodipoda, Kroyer gives his own opinion that they ought not to constitute a separate order, but to be united with the Amphipoda, as a family of that order. This had been already done by Burmeister, but as he at the same time united the Pycnogonida to the Amphipoda, Kroyer thinks that his systematic arrangement was not well grounded. Krøyer points out that the Læmodipoda no less than the Amphipoda have seven segments to the peræon (Brystringe), the first being always distinguished from the head by a more or less obvious line of demarcation; the mandibles, though sometimes without a palp, in some species have a large, three-jointed one; the eyes are not, as Burmeister states, simple, but "consist, as in the Amphipoda, of a number of small pyriform lenses, ensheathed in pigment and covered by a common cornea;" the want

of side-plates (epimera) only carries a little further the reduction observed in some Amphipoda, especially *Gammarina gressoria*. Where the action of the pleon keeps up a fresh supply of water to the branchiæ, Krøyer thinks that the side-plates covering the branchiæ may attain their fullest development without interfering with respiration, but that in the Læmodipoda, there being no pleon to fulfil this office, the branchiæ have to be left free. The absence of a pleon he connects with their mode of life, which leads them to cling and climb, and only very rarely to swim. Important as this mark of difference is, Krøyer urges that its weight is much diminished by the discovery of two new genera of Læmodipoda, in one of which the pleon, though small, has five segments, in the other only two, but in both is furnished with two pairs of jointed limbs. Thus, he considers, a transition is established to those Amphipoda, such as *Corophium*, in which the pleon is less strongly developed. He mentions that the genus *Cerapodina* wants feet on some of the segments of the peræon in common with the Læmodipoda, but that argument only rests on the faulty description of *Cerapodina*. He considers that the Læmodipoda, as a family or division of the Amphipoda, come nearest the *Gammarina gressoria*, referring to the pediform antennæ among other marks of resemblance. He characterizes the family as follows:—"Pleon rudimentary or only little developed. No Epimera. The first of the seven peræon-segments united with the head along an oblique line, its pair of feet projecting under the maxillipeds. Feet generally wanting on the third and fourth peræon-segments. All the feet are in general claspers, that is to say, furnished with hand and movable finger. Only two or three pairs of branchial vesicles (on the second and third [3rd and 4th], or on the second, third and fourth peræon-segments). Antennæ more or less pediform, the upper always larger and stronger than the lower. Eyes very small, circular." Of the family he makes two subdivisions:—"*Caprellina*. Form generally very elongate, thin, cylindrical. Branchial-plates bladder-like. The lower antennæ of moderate size, and the feet of moderate strength. Often a palp on the mandibles. "*Cyamea*. Form generally very flat and broad. Branchial-plates very large, sword- or sabre-shaped, sometimes bipartite, in the males furnished with special appendages at the base. The lower antennæ rudimentary. Feet extraordinarily developed. Mandibles without palp."

The general form, he says, has ceased to be a striking distinction between the two subdivisions, since the discovery of a thin *Cyamus* in *Cyamus gracilis*, and a stout *Caprella* in *Caprella dilatata*. To the *Caprellina* he assigns four genera, 1. *Leptomera*, Latr., 2. *Cercops*, Kr., 3. *Ægina*, Kr., 4. *Caprella*, Lam. All these he defines; the two new ones as follows:—*Cercops*. "Quinqve pedum paria, omnia manu armata subcheliformi. Mandibula palpo instructa triarticulato. Flagellum antennarum inferiorum biarticulatum, articulo ultimo primum ferme longitudine æquante. Tria vesicularum branchialium paria (annuli thoracici secundi, tertii & quarti). Abdomen distinctum, qvinqvearticulatum, appendicibus quatuor elongatis, biarticulatis." *Ægina*. "Qvinqve pedum paria, omnia manu armata subcheliformi. Mandibula palpo instructa triarticulato. Flagellum antennarum inferiorum biarticulatum, articulo ultimo fere rudimentari. Duo vesicularum branchialium paria (annuli thoracici tertii et quarti). Abdomen minutissimum, sed sat distinctum, biarticulatum, appendicibus qvatuor elongatis, duabus anterioribus biarticulatis, posterioribus uniarticulatis."

Latreille's *Naupredia* (*Naupridia* in Milne-Edwards) is dismissed by Krøyer as founded on a misconception, and the identity of *Proto*, Leach, with *Leptomera*, Latreille, being pointed out, the claim of *Proto* to priority is vindicated. Why Krøyer himself does not adopt it is not explained.

"*Caprella Januarii* Kr. (Tab. VI. fig. 14–20)" from Rio-Janeiro, is described with much detail. This species is identified by Spence Bate with the earlier *Caprella æquilibra*, Say. Mayer agrees with Spence Bate, and points out that Krøyer, usually so exact, does

not mention the ventral median spine on the second peræon-segment of the male. Kroyer calls attention to the great difference between the adult males and females, especially shown in this, but existing also in other, species of *Caprella*.

"*Cercops Holbölli* Kr. (Tab. VI. fig. 1–13)," from South Greenland, is described in detail. It is still the only known species of the genus. In regard to the quinque-articulate pleon, in a note Kroyer says, "it is possible, as in itself not improbable, that the pleon consists of six rings, in that the ring which I have treated as the fifth, is perhaps composed of two pretty closely united."

"*Ægina longicornis* Kr. (Tab. VII. Fig. 1–12)," also from Greenland, is next described.

At page 585 begins the description of "*Caprella dilatata* Kr. (Tab. VIII. fig. 1–9)," from Rio Janeiro. Mayer identifies it with the earlier *Caprella acutifrons*, Latreille. "*Caprella septentrionalis* Kr. (Tab. VIII. fig. 10–19)," already alluded to in previous papers, is here fully described, without the reference to "*Squilla lobata* Fabr. Fn. Gr. n. 225," given in Grönl. Amph. It is said to be the commonest of the *Caprellina* in Greenland.

For "*Caprella lobata* Müll. (Tab. VII. fig. 24–28)" Kroyer gives the references

"*Müller*, Zool. dan. Prodr., n. 2359 : Squilla lobata.

" — Zoologia danica, fasc. II^us^, pag. 21 : Squilla quadrilobata.

" — — — fasc. III^us^, pag. 58 : Gammarus quadrilobatus.

"*Linné*, Systema naturæ, edit. XII^ma^, pag. 1056 : Cancer linearis?

"*Pallas*, Spicil. zool. IX. 78 : Oniscus scolopendroides?

"Zool. danica tab. 56 fig. 4–5 ♂ og tab. 114 fig. 11–12 ♀."

These are followed by a full description, winding up with the discrimination of three varieties as follows: "var. *α*. superficies dorsalis annuli thoracici qvinti, sexti, septimiqve aculeis destituta. var. *β*. superficies dorsalis annuli thoracici qvinti, sexti septimiqve aculeis destituta; laminæ branchiales suborbiculares. var. *γ*. caput annulusque thoracis secundus, tertius qvartusqve aculeis nodisve minutissimis prædita." Mayer assigns the species, with varieties *α* and *γ*, to the name *Caprella linearis* (Linn.) Bate. var. *β*., he thinks may belong to Kroyer's *Caprella septentrionalis*, though that itself, he supposes, may be but a variety of *Caprella linearis*.

"*Caprella Hystrix* Kr. (Tab. VIII. fig. 20–26)," of which the largest specimen was only about 3‴ long, is regarded by Mayer as, with little doubt, a young form of *Caprella acanthifera*, Leach, and quite distinct from the *Caprella hystrix* of Bate and Westwood.

"*Leptomera pedata* Abildg. (Tab. VII. fig. 13–23)," receives a full description, preceded by the following references and synonyms :—

"*Müller's Prodromus*, n. 2360 : Squilla ventricosa (Gunnen).

" — Zool. dan. Fasc. II^us^, pag. 20 : Sq. ventricosa (Gunnen).

"*Abildgaard*, Zool. dan. Fasc. III^us^, pag. 33 : Gammarus pedatus (Gammen).

"*Desmarest*, Consid. s. les Crustacés pag. 276 : Leptomera ventricosa (♀).

" — — — — — — Proton pedatum (♂ & ♀).

"*Latreille i Cuviers* Règne an. IIeme ed. IV, pag. 128 : Naupredia?

"Zool. dan. tab. 56 fig. 1–3 (♀) og tab. 101 fig. 1–2 (♂)."

Kroyer notices the incorrectness of the view propounded by Eschscholtz, 1830, that *Leptomera rubra*, Lam., might be regarded as a synonym of *Caprella scolopendroides*, Lam. He recognises the priority of the name *ventricosa*, but rejects it for the insufficient reason that its meaning is only suitable to the female. Mayer reinstates it, in the title *Proto ventricosa*, O. F. Müller.

1843. Rathke, M. H.

Beiträge zur Fauna Norwegens. Mit 12 Kupfertafeln. Besonderer Abdruck aus den Verhandlungen der kaiserl. Leopoldinisch-Carolinischen Akademie der Naturforscher. Band XX. Abth. I. Breslau. 1843. (Amphipoda. pp. 63–98. Pl. III. IV.)

On pages 60–63, Rathke describes *Liriope pygmæa* as type of a new Amphipod genus. The name *Liriope* had been already used for a genus of Medusæ by Lesson, and Dana recognised that the creatures described by Rathke were not Amphipods. A full account is given in the British Sessile Eyed Crustaceans, vol. ii. pp. 257, etc., of what is known of these strange animals, and of the nomenclature, under the genus *Cryptothiria*, among the Bopyridæ.

Of the genuine Amphipods, Rathke's *Gammarus anomalus* n. sp. (Tab. IV. Fig. 7.) is by Spence Bate and Boeck named *Microdeutopus anomalus*. *Gammarus sunderallii* n. sp. (Tab. III. Fig. 2.) was redescribed by Bate and Westwood as "*Liljeborgia Shetlandica*," by myself as "*Liljeborgia Normanni*," and by Hoek as *Cheirocratus brevicornis*, its name finally being *Cheirocratus sunderallii*. *Gammarus pœcilurus* n. sp. (Tab. IV. Fig. 2.) and *Gammarus krøyeri* n. sp. (Tab. IV. Fig. 1.) are alike identified with *Gammarus marinus*, Leach, both by Sp. Bate and Boeck. Of *Gammarus sabini*, Leach, Rathke gives a new description in order to distinguish it from his own nearly-related species, *Amathia carinata*, from the Crimea, and *Gammarus angulosus*, n. sp. (Tab. III. Fig. 3.) from Norway. Nevertheless, it is not an absolutely untenable opinion that these three species are in reality identical. That his *Gammarus angulosus* is not the young of *Gammarus sabini*, Rathke thinks is proved by two circumstances, first, that he had seen several specimens of it with eggs, and secondly, that the young of *Gammarus sabini* of the same size (4 to 4½ lines) have already the same shape as the old. But the female may be very much smaller than the male, as in *Melita palmata* and other species, and Rathke's observation as to the young of *Gammarus sabini* does not agree with the experience of some other observers. Bate and Westwood unite *Gammarus angulosus* with *Amathilla sabini*, and would do the same to *Amathia carinata*, but for the (insufficient) reason that Rathke himself says that it is different.

Rathke's *Gammarus zebra* n. sp. (Tab. III. Fig. 4.) is identified by Spence Bate with the female of *Podocerus cylindricus*, Say, which Boeck accepts as a synonym only with a ?, placing the species under *Podocerus* (*Ischyrocerus*) *anguipes* of Kroyer. *Amphithoë tenuicornis*, n. sp. (Tab. IV. Fig. 3.), is named *Dexamine tenuicornis* by Spence Bate, who notices the improbability of Rathke's statement that the species has no telson, and observes that "certainly Rathke's *tenuicornis* is very closely allied to, if not identical with Montagu's *spinosus*." Of the latter species Boeck makes it a synonym. *Amphithoë podoceroides*, n. sp. (Tab. IV. Fig. 4.) which Sp. Bate transferred to his genus *Sunamphithoë*, is retransferred by Boeck to *Amphithoë* and made to supersede *Amphithoë littorina*, Sp. Bate. In my opinion *Cancer Gammarus rubricatus*, Montagu, is the same as *Amphithoë littorina*, in which case the name will stand as *Amphithoë rubricata*. *Amphithoë prevostii*, M. Edwards? (Tab. IV. Fig. 5), is said to have no telson. At p. 264*c* it is established as a distinct species, with the name, "*Amphithoë Nilssonii*"; it has already been discussed in the note on Rathke's earlier work, 1837. *Amphithoë norvegica*, n. sp. (Tab. IV. Fig. 6.), is now placed in the genus *Calliopius* (see Sp. Bate and A. Boeck). Of the new genus *Iphimedia*, the following definition is given:— "Antennæ superiores inferioribus breviores: illarum pedunculus e tribus, harum e quatuor articulis compositus: omnium flagellum tenue, multiarticulatum. Pedes secundi paris manibus simplicibus, primi paris, illis minores, chelis instructi, quarum pollex ex uno tantum articulo constat: reliqui pedes iis Gammarorum similes. Pedes spurii in duos ramos plus minusve complanatos divisi." Spence Bate objects to this definition that the hands of the

second gnathopods are not simple, but subchelate, as Rathke's figure represents them. This is only a question of terminology, as may be seen from Rathke's specific description, "An dem zweiten Beinpaare (*K*) kommen nur Andeutungen von Händen vor, indem das letzte Glied derselben kaum etwas breiter, als das vorletzte, übrigens aber ziemlich lang, tafelartig dünne und mit seinem hinteren unteren Winkel so hervorspringend ist, dass es hier einen platten, breiten und abgerundeten Fortsatz bildet, der ungefähr halb so lang erscheint, als die dicht vor ihm eingelenkte Klaue." The type species, to which this description applies, is named *Iphimedia obesa* (Tab. III. Fig. 1.). Kroyer afterwards described the same species as *Microcheles armata*, and Dana, altering the definition, included in the genus species which have nothing to do with it.

Podocerus capillatus, n. sp. (Tab. IV. Fig. 8) is said by Rathke to come near *Podocerus variegatus*, Leach, but to be adequately distinguished from it. In this view Bate and Westwood agree with him. Bruzelius named it *Jassa capillata*. Boeck considers it the same as *Podocerus variegatus*, which was the type of Leach's genus *Podocerus*, but he rejects Leach's genus *Jassa* as synonymous with his *Podocerus*. *Jassa* of Bruzelius he alters into *Janassa*, because after Leach's time *Jassa* was used for a fish. He then enters *Podocerus capillatus*, Rathke, as a synonym of *Janassa variegata*, Leach. But surely, when a genus is retained, the type species must continue to belong to it, and if *Janassa variegata* really differs generically from the other species of *Podocerus*, *Janassa* must be called *Podocerus*, and the other species by some other name. The muddle that will ensue may best be avoided by re-uniting *Janassa* to *Podocerus*, from which it is separated only by fine-drawn distinctions. *Podocerus calcaratus*, n. sp. (Tab. IV. Fig. 9 4) Boeck unites to *Podocerus falcatus*, Montagu. The *Caprella phasma*, Lamarck, *Caprella acuminifera*, Leach ! and *Caprella scolopendroides*, Lam. (*C. linearis*, Latr.) all belong to *Caprella linearis*. *Leptomera pedata*, Lam. (*Proto pedata*, Desmar.) corresponds to *Proto ventricosa*, O. F. M.

1843. Kraus, Ferdinand.

Die Südafrikanischen Crustaceen. Eine Zusammenstellung aller bekannten Malacostraca, Bemerkungen über deren Lebensweise und geographische Verbreitung, nebst Beschreibung und Abbildung mehrer neuen Arten. Mit IV lithographirten Tafeln. Stuttgart. 1843.

The only Amphipods noticed are *Orchestia bottæ*, Milne-Edwards, *Gammarus pulex*, Fabr., *Cyamus erraticus*, Roussel de Vauzème, and *Cyamus ovalis* of the same author. Lütken notices that the identification by Kraus of *Cyamus erraticus* with *Cyamus ceti*, Desmarest, is erroneous.

1844. Costa, Oronzio Gabriele.

Catalogo de' Crostacei raccolti nel Golfo di Taranto *Nella primavera del* 1830. Atti della R. Accademia delle Scienze, sezione della società reale borbonica. Vol. V. (pte. 2) Napoli. Nella Stamperia Reale, 1844. pp. 67–74. (Apparently read in 1830, though published so long after; the Royal Society Catalogue of Printed Papers gives the date as 1843 [1830].)

In the second Legion, Edrioftalmi, Order 3, Anfipodi, are given *Orchestia littorea*, and *Gammarus fasciatus*, a new species which is figured Tav. i. f. 3, but not described, except in so far as two

varieties are thus mentioned. "Var. *a*, *corallinus*. Var. *b*. *violaceus*." In Order 4, Lemodipodi, are given *Caprella phasma*, *Caprella linearis*, *Caprella acutifrons*. *Aeeus forficularius* and *Praniza coeruleata* are now placed in the 5th Order, Isopodi.

To judge by the figure Costa's *Gammarus fasciatus* must belong to the *Mæra* and *Melita* group. It is not mentioned in the Brit. Mus. Catalogue, and is quite distinct from the earlier *Gammarus fasciatus*, Say, which is there described and figured. The three last segments of the peræon and the three first of the pleon are dorsally produced backwards into small teeth, the fourth and fifth of the pleon into large ones. The side-plates of the peræon are represented as low and all nearly alike. The lower hinder angle in the first three segments of the pleon is produced sharply backwards. The upper antennæ have a long peduncle, the first joint long, the second still longer, the third not very short. No secondary appendage is shown. The second gnathopod has a large hand, with bidentate palm. The fourth peræopod is rather longer than the fifth. The first joints are but slightly dilated. The branches of the third uropods extend far beyond those of the second and third. In spite of some differences it seems tolerably clear that this is the *Ceradocus orchestiipes* of Achille Costa, said by him to have been "found by Prof. O. G. Costa in the Gulf of Tarentum," though he gives no reference to *Gammarus fasciatus*. Since the name *Gammarus fasciatus* lapses as pre-occupied by Say, and since *Ceradocus* is recognised by Heller as identical with *Mæra*, O. G. Costa's species will become a synonym of *Mæra orchestiipes*, A. Costa.

Fig. 23.

1844. De Kay, James E.

Zoology of New-York, or the New-York Fauna; comprising detailed descriptions of all the animals hitherto observed within the state of New-York, with brief notices of those occasionally found near its borders, and accompanied by appropriate illustrations. Part VI. Crustacea. Albany, 1844.

The Crustacea belonging to "Order III. Amphipoda," and "Order IV. Lœmipoda," are described on pages 35 to 41. In the preliminary list of works consulted, no mention is made of Rafinesque, on whose lucubrations, had he seen them, this author might have thrown much light. De Kay includes in his definition of the Amphipoda the old statement not universally applicable, that the mandibles are furnished with a palpus. Of the species which he figures his descriptions are probably independent, though only one of the species is new. For *Orchestia longicornis*, Say, "Pl. IX. fig. 28 & 28A. Female," he says:—"Eyes oval. Lower antennæ longer than the body; the third joint, under the lens, armed with series of short spines, the fourth joint, with about thirty articulations, minutely spinous beneath. Second pair of feet with the hands dilated, oval, smooth, with two obtuse spines on the anterior margin; one at the lower angle, and the other more elevated in the middle; the thumb much curved, acute at its tip, which rests on the interval between the two tubercles (see fig. 28, A.). The two posterior pairs of feet longest. Upper pair of antennæ short, not extending beyond the second joint of the lower pair. Length, 0·5–1·0. These small crustaceans are well-known under the name of *Sand-flea* or *Beach-flea*, occurring along the shores of Long island, digging holes in the sand in which they conceal themselves, and living upon dead animal substances. They furnish an abundant supply of food to the numerous birds along that coast."

Of *Orchestia gryllus*, Bose, pl. vii. fig. 19, he says :—"Lower antennæ much shorter than the body, slightly hairy, but not rugose upon the third peduncular joint; last article with about twenty-five articulations. Anterior pair of feet with a prominent obtuse tubercle on the antepenultimate joint; penultimate joint dilated into an obtuse tubercle at the inner tip to receive the thumb. Palm convex so as to receive the thumb without an interval, as long as the lower edge of the hand. Length, 0·5–0·6. Habit of the preceding, and abundant along the sandy beaches above the influence of the tide."

Of *Talitrus quadrifidus*, pl. ix. fig. 27, he gives the following description :—"Head compressed, eyes obliquely oval. Lower antennæ shorter than the body, and only reaching as far back as the fourth segment, slightly hairy and somewhat rugose on the third joint. Upper antennæ very short, scarcely exceeding the second joint of the lower ones. Body compressed. Tail with three appendices terminating in four spines, each furnished with a series of rigid setæ. All the feet armed with a slender acute claw. *Color*, dark brown; eyes blackish brown. Length, 0·3–0·5. This species also passes under the name of *Beach-flea*, and is frequently found concealed under stones and sea-weed."

Of *Gammarus minus*, Say, pl. ix. fig. 29, he says:—"Body incurved, subcompressed. Upper antennæ longest, with the setæ short, attaining the tip of the second articulation of the terminal joint, which has about twelve articulations. Eyes reniform. *Color.* Body whitish, with a few pale fulvous spots on the sides. In dried specimens, the color becomes reddish, and the lateral spots, more particularly towards the tail, are bright red. Length, 0·15–0·3. This species is common in most of our fresh-water streams, and may often be detected under stones and pieces of wood. It is extremely active, and is popularly known under the name of *Fresh-water Shrimp*."

As "extra-limital" species, he gives brief accounts of *Gammarus mucronatus*, Say; *Gammarus fasciatus*, Say; *Gammarus locusta*, Montagu; *Gammarus appendiculatus*, Say; *Amphithoe serrata*, Say, *Amphithoe dentata*, Say, *Amphithoe punctata*, Say. His account of *Cerapus* is as follows :—"Genus Cerapus, Say. Antennæ very large and robust, nearly equal; the upper of four joints, the lower or lateral ones of five. Anterior pair of feet small, monodactyle; the second pair with a broad palm and a two-jointed thumb. Head distinct, ending in a small rostrum. "*C. tubularis.* (Id. [Say, Journ. Acad. Nat. Sc.], p. 49. *C. abditus*, Templeton, Tr. Ent. Soc. Lond. Vol. i, pl. 20, fig. 5. See Pl. 10, fig. 43 of this work.) Head with a mucronate carina before, hand and first joint of the thumb with one or two obtuse teeth; eyes oval, black. *Color.* Body above blackish, with irregular paler spots; antennæ and feet white; joints tipped with blackish; two hind pair of feet and tail white. Inhabiting a membranous tube open at both ends. Length, 0·25. *Sea-beach, Egg Harbor, New Jersey.*" This is followed by an account of Say's *Lepidactylis dytiscus*, of Say's *Uneiola irrorata*, and of *Hyperia*, Latreille, to which he assigns "Hyperia latreilli. (Edw. An. Sc. Nat. Vol. 20, p. 388. Say, *Lancola pelagica*, Ac. Sc. Vol. I, p. 318. Gould? *loc. cit.* p. 335.) Anterior pair of feet shortest; third, fourth, and seventh equal: fifth longer; sixth longer than the thorax. This species is probably the same noticed by Dr. Gould under the name of *H. galba*, Mont., as occurring in the pouches of *Medusa* ———, on the coast of Massachusetts. Mr. Say's specimen was obtained from the Gulf stream." Lastly he describes Say's *Podocerus cylindricus*. Under Lœmipoda he figures, plate vi. fig. 14, and describes *Cyamus ceti*, which, he says, "is usually found attached to the bodies of whales along our coast, and occasionally on tunnies and other large marine animals. It varies much in form according to its degree of development, and this has given rise to several nominal species, which have not yet been sufficiently examined." In the description he speaks of the second and third pairs of feet as "replaced by slender appendices, at the bases of which are the branchial vesicles." As "extra-limital," he notices *Cyamus obtruncatus*, Say. In the genus *Caprella* he describes Say's species, *Caprella geometrica*, and as "extra-limital," notices the two species mentioned by Gould in 1841, and *Caprella equilibra*, Say.

1844. Milne-Edwards.

Crustacés. Dictionnaire universel d'histoire naturelle. Dirigé par M. Charles d'Orbigny. Tome quatrième. Paris, 1844. pp. 378–412.

The two orders, Amphipodes and Laemodipodes, are defined at page 382. The tribes, families and genera pertaining to them are named, and to *Cyame* is subjoined the remark, "Je suis porté à croire qu'il faudrait rapprocher de ce groupe les Pycnogonides."

1844. Tellkampf, Theodor G.

Beschreibung einiger neuer in der Mammuth-Höhle in Kentucky aufgefundener Gattungen von Gliederthieren. Archiv für Naturgeschichte. Gegründet von A. F. A. Wiegmann. Herausgegeben von Dr. W. F. Erichson. Zehnter Jahrgang. Erster Band. Berlin, 1844.

On pages 321, 322, is given the description of "Triura cavernicola. (Fig. 18.) *Crustacea. Malacostraca,*" with "Character. 10 Fusspaare, von denen die vorderen 2 Paare in Palpen verwandelt sind. Drei Schwanzspitzen." Without the remainder of the description, the copy of Tellkampf's fig. 18 will suffice to show that this creature cannot belong to the

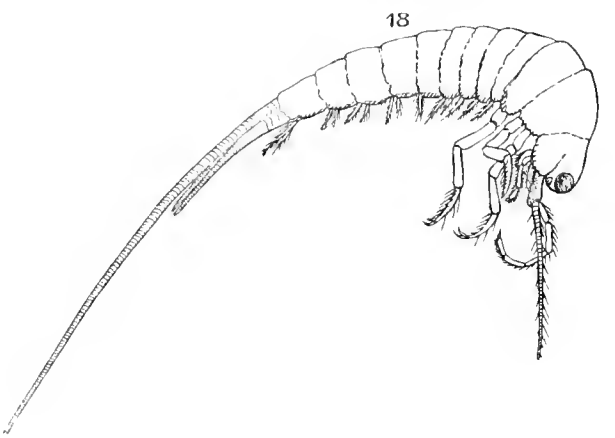


Fig. 24.

Amphipoda, as suggested by Schiodte, and afterwards by Boeck. Dana, Choristopoda, p. 306, says in a note, "Genus *Triura*, Tellkampf, Rhœæ forsan affinis."

It is mentioned, but not described in the Archiv für Anatomie, Physiologie und wissenschaftliche Medicin, herausgegeben von Dr. Johannes Müller, Berlin, 1844, p. 383.

1844. Thompson, William, died Feb. 17, 1852 (Hagen).

Additions to the Fauna of Ireland. The Annals and Magazine of Natural History. Vol. XIII. London, 1844. pp. 430–440.

In the list of Crustacea, p. 435, he mentions "*Proto pedatum*, Müll. (sp.), Zool. Dan.; *Leptomera pedata*, Edw., Hist. Crust. vol. iii. p. 109. Among *Algæ* dredged at Bangor,

County Down, 1834, Mr. Hyndman and W. T." There is nothing else about Amphipoda. On "*Pychnogonum balænarum*, Fabr.," he observes, "*Pyc. balænarum* must on our coast be content with a smaller victim than a whale, and condescends to suck the juices of an *Actinia*."

1844. Zaddach, Ernst Gustav, died June 5, 1881 (Friedländer, Naturæ novitates).

Synopseos crustaceorum Prussicorum prodromus. Regiomonti, 1844.

Under the heading "Crustacea, adhuc in provincia nostra Borussia reperta," Zaddach enumerates seven Amphipods. These he names 1. *Talitrus saltator*, M.-Edw., which is better called *Talitrus locusta;* 2. *Gammarus locusta*, Fabr. (?), his doubt being occasioned by differences which he found in his specimens from the description by Milne-Edwards; 3. *Gammarus fluviatilis*, M.-Edw., which is *Gammarus pulex*, De Geer; 4. "*Gammarus Dugesii*," M.-Edw., which has been identified with *Melita palmata;* 5. "*Amphithoe Rathkii*, nov. spec.," which, in Zaddach's opinion, "maxime affinis est *Amphithoæ norwegicæ*," Rathke, and by Boeck is identified with the neighbouring species *Calliopius lævisculus*, Kroyer; 6. *Leptocheirus pilosus*, n. g. et sp.; and 7. *Corophium longicorne*, Latr.

The new genus Leptocheirus is thus defined :—

"Inter Amphipoda, quæ in maris baltici littoribus habitant animalia reperta sunt, quæ, concesso genera Amphipodum notis a *Milne Edwards* constitutis discernenda esse, nulli generi adhuc descripto adnumerari possunt, sed in novum genus, quod Leptocheirum nuncupari propono, colligenda sunt. Genus enim Amphithoe secundum illum scriptorem pedibus duorum primorum parium cheliferis, ceterorum non prehensilibus, et antennis superioribus inferiorum trunco longioribus simplicique flagello instructis insigne est. Illa autem animalia, quæ nunc describam, cum genere Amphithoe antennarum quidem structura ceterorumque partium formis omnino conveniunt, pedum autem secundi paris constructione ab his differunt et generi Talitro similiora sunt. Hi enim chelis vacui nec ad comprehendas [comprehendendas] res apti nec ad gradiendum sunt habiles, sed debiles compressique a lateribus et contracti ceterisque pedibus occulti reperiuntur. Ne autem fines hujus novi generis augustiores fiant, hac singulari pedum constructione non respecta, 'quæque Amphipoda saltatoria pedibus primi tantum paris cheliferis, ceteris non prehensilibus et antennis superioribus flagello auxiliario vacuis inter se congruunt, generi Leptocheiro adnumeranda esse' puto."

In the description of the type species, Zaddach very plainly says, "Mandibularum palpi e tribus articulis constant, articulis pæne inter se æqualibus, ultimo piloso," so that Boeck, De Skand. og. arkt. Amph., p. 548, seems under some misapprehension when he says, "Müller viste i 1818 (Arch. f. Naturgesch. xiv. p. 62), at Zaddach havde overseet, at Kindbakkerne ere forsynede med en Palpe, ligesom han ikke havde bemærket, at de øvre Følere have en Bisvøbe." That the upper antennæ have a minute accessory flagellum is in fact remarked by Müller. Boeck retains the name *Leptocheirus*, though affirming that it is pre-occupied for an insect, but the earlier name alluded to is spelled *Leptochirus* if Scudder may be trusted on the point.

1845. Goodsir, Harry D. S.

Description of some Animals found amongst the Gulf-Weed. The Annals and Magazine of Natural History. No. 96. February 1845. Vol. XV. London. 1845.

At p. 75 he describes "*Amphitöe pelagica*. Pl. VII. fig. 1. *A.* with peduncle of superior antennæ about half the length of the inferior antennæ, being almost the same length as the first three

joints of the peduncle of the lower antennæ. First pair of legs small, second pair with the wrist very much enlarged, and the claw sickle-shaped and moveable, inferior edge having a small tooth with a slight notch on either side of it near the distal extremity; claw as long as the wrist, and tapering very gradually to a point." The figure shows that by "wrist" in the above description the large ovate hand of the second gnathopod is intended. The antennæ are slender, the lower only about half the length of the upper. The right number of legs are shown, but there are distinctly nine peræon-segments figured. The uropods and telson are small. The Brit. Mus. Catalogue certifies that Goodsir's species is identical with *Amphithoe pelagica*, Milne Edwards.

1845. KRØYER, HENRIK.

Karcinologiske Bidrag. Naturhistorisk Tidsskrift. Ny Række. Første Bind. Kjobenhavn, 1845. pp. 283–345, Pl. I.–III. and pp. 403, 453–638, Pl. VI. VII.

After a detailed account of the new species, *Podalirius typicus*, the new genus *Podalirius* is thus described:—

"*Quatuor* pedum paria (annuli thoracici primi, secundi, sexti et septimi); pedes annuli thoracici qvinti prorsus rudimentarii, ungve carentes, biarticulati, natatorii (?). Mandibula palpo destituta. Flagellum antennarum inferiorum biarticulatum; articulo secundo dimidiam primi longitudinem æquante vel superante. Duo vesicularum branchialium paria distincta (annuli thoracici tertii et quarti). Abdomen minutissimum, biarticulatum.

"*Pod. typicus:* fuscus, pilosus, capite thoraceque inermibus. Long. 2‴. Hab. in Asteracanthio rubente."

"Fig. prima tab. IIIæ exhibet annulum thoracicum quintum cum pede rudimentario et vesicula branchiali (?) rudimentaria."

P. Mayer vindicates Kroyer's accuracy in the above account against various succeeding writers. The rudimentary branchia (?) is, however, he says, as Kroyer himself suspected, only a sexual appendage (die weiblichen Geschlechtsklappen) of the female. Mayer adds that the lower antennæ are without "Ruderhaare," and that in *Podalirius krøyeri*, Haller, there are traces of the first and second peræopods.

Krøyer next describes *Orchestia grandicornis*, n. s., from Valparaiso, figured Tab. 1. fig. 2. a–n, and accidentally misnamed *Orchestia longicornis* on the plate. This species is omitted from the Brit. Mus. Catal. It evidently belongs to *Hyale*. The next species, *Orchestia nidrosiensis*, n. s., is identified by Boeck with *Hyale nilssonii*, Rathke, Kroyer himself having suspected that this and the preceding species were separated from *Orchestia* by their longer upper antennæ, and the unguis of the maxillipeds. *Orchestia platensis*, n. s., tab. ii. fig. 2, a–i, from Monte Video, though retained by Spence Bate as a separate species, has in his opinion nothing but locality to distinguish it from *Orchestia gryllus*, Bosc, a North American species. *Talitrus tripudians*, n. s. ♀, tab. iii. fig. 2, a–e, is identified by Boeck as the female of *Orchestia gammarellus*. It is omitted from the Brit. Mus. Catal. *Gammarus anisochir*, n. s., tab. ii. fig. 1, a–p, from Rio Janeiro, was transferred to *Mæra* by Dana, who thought it very near *Mæra setipes;* by Spence Bate it was referred to *Melita*. Kroyer himself was inclined to make it the type of a new genus, *Anisochir*, but he was restrained by finding that the female was a true *Gammarus*, and the male only distinguished from that genus by having the second gnathopod on the left side strongly chelate. He considered it very near to, though clearly distinct from, *Gammarus appendiculatus*, Say. Kroyer here takes the opportunity of criticising Milne-Edwards' division of the *Gammari* by the shape of the eyes as very artificial and perhaps untrustworthy. The absence of the accessory flagellum on the upper antennæ, which separates *Amphithoë* from *Gammarus*, he considers a comparatively

trivial character. The want of a second ramus on the third uropods, or its quite rudimentary condition, he thinks may be of considerable importance, considering the relation of these uropods to the frequent springing movements of the *Gammari*, and that on this account not only his species *anisochir*, but *podager*, Milne-Edwards, *dentatus*, Kroyer, *brevicaudatus*, Milne-Edwards, might form a separate genus. The first three have since been transferred to *Melita*, the last to *Gammarella*.

Kroyer next describes *Aora typica*, n. s., tab. iii., fig. 3, a–l, the new genus *Aora* being described as follows :—

"*Antennæ superiores* flagello instructæ gracillimo, flagelloque appendiculari ; *antennæ inferiores* subpediformes. *Labium inferius* profunde bifidum ; laciniæ ternis armatæ hamis maximis marginis anterioris appendiceque magna subpalpiformi ad basin marginis exterioris. *Pedes maxillares* palpo brevi. *Pedes primi et secundi* paris thoracici manu instructi subcheliformi. *Pes primus* maris maximus, articulo tertio postice in apicem longissimum producto, manu angusta, ungve fere lamellari. *Pedes tertii et quarti* paris articulo quarto ovali, manum præbente, cujus ungvis efficitur articulo quinto et sexto. *Quintum pedum par* brevissimum, robustum ; sextum par septimumque quinto multo longiora sed graciliora. *Epimera* sat parva, setis instructa marginis inferioris. *Pedes abdominales* quarti, quinti et sexti paris saltatorii ; par sextum, ut quartum et quintum, binis armatum stylis saltatoriis, qui vero setis apicalibus (non aculeis) præditi sunt. Appendix caudalis duabus formata laminis hamatis."

There seems no doubt that Kroyer was misled by a lateral view of the telson into supposing it bifid ; his description of the "hand" in the first and second peræopods is rightly rejected by Boeck ; Kerguelen specimens of an *Aora*, very closely allied to Kroyer's species, exhibit the characters of the lower lip which he describes, but the marginal hooks are not so large as those which he figures, and the appendages which Schiodte has designated "mandibular processes," though more than usually produced, scarcely suggest the epithet subpalpiform.

As largest of the South American Amphipods he had met with, Kroyer describes from Valparaiso, *Amphithoe femorata*, n. s. (Tab. iii. fig. 4, a–i), $9\frac{1}{2}'''$ long, the antennæ not included, intermediate between *Amphithoë* and *Photis*, and suited, Kroyer thinks, to be the type of a new genus, when the Amphipoda come to be thoroughly revised. It agrees, he observes, with all that Milne-Edwards says of his "*Amphithoe Gaudichaudii*" from the Brazils, except in the conical rami of the third uropods assigned to that species. But one of Kroyer's own figures shows that also in *Amphithoe femorata*, from a certain point of view, these rami may appear to be conical. Kroyer thus defines the species :—"Forma robusta, dorso rotundato, fronte, thorace et abdomine inermibus. *Antennæ superiores* dimidiam animalis longitudinem superantes, pedunculo valido, flagello setiformi ; secundus pedunculi articulus primo parum modo brevior, multo vero gracilior ; tertius articulus cum articulis flagelli et longitudine et crassitudine fere convenicns. *Oculi* suborbiculares, minuti. *Antennæ inferiores* subpediformes, superioribus tertia ferme parte breviores, flagello dimidiam pedunculi longitudinem æquante, ultimumque ejus articulum longitudine superante (quinta parte). *Pedes thoracici primi et secundi* paris feminæ manu ferme rectangulari, cujus margo inferior sat profunda sed angustissima præditus est incisura ad ungvem excipiendum. Pes primus maris ut feminæ ; secundi vero pedis manus acuminata, incisura carens. *Pedes tertii et quarti* paris articulo primo maximo, valde dilatato, laminari ; ungve parum mobili. *Quintum par* robustissimum, femore (ɔ : articulo primo) latiori quam longo; ungve prehensili (ut et sextum par septimumque). *Epimera* magna, margine inferiori piloso ; epimerum quintum postice profunde et angulariter excisum ad femur quinti pedis excipiendum, quum supra dorsum protendatur. *Pes abdominalis sexti* paris robustissimus, stylis brevissimis ; exteriori sublongiori, subconico, inferius bihamato et spinosissimo ; interiori suborbiculari. *Appendix caudalis* unica constat lamina triangulari, setis marginis posterioris quatuor."

This species is omitted from the Brit. Mus. Catal., 1862.

At p. 403 (see Index and p. 476) a new species, as Krøyer supposed, is introduced under the name *Caprella longispina*, which he soon after transferred to the genus *Ægina*. *Ampelisca rotundata* (for which see Note on Liljeborg, 1852) is also according to the Index, mentioned on p. 403; *Amphithoe albomaculata* is said to be mentioned on the same page, and the genus *Ægina* on p. 402, but these two pages I have not seen.

In the Continuation, the description of Amphipoda begins at p. 476 with *Ægina longispina*, Kr.; this he found necessary to remove from *Caprella*, in which he had previously placed it, by reason of the mandibles having palps. He doubted whether it ought not to become the type of a new genus, since he found rudimentary branchiæ on the fifth peræon-segment, and the pleon tri-articulate, without any trace of limbs or appendage. Mayer considers that the supposed branchiæ were the external sexual organs of a female specimen, and agrees with Spence Bate in identifying this species with *Protella phasma*, Montagu.

The new genus "*Siphonoecetes*, novum Amphipodum genus, ad Gammarina gressoria referendum," is thus described:—

"*Antennæ superiores* inferioribus multo breviores, subpediformes, flagello brevi, pauciarticulato; antennæ *inferiores* pediformes. *Oculi* haud conspicui. *Mandibula* angulo antico-interiori profunde bifurcato, tuberculo molari denticulato, palpo brevi uniarticulato. *Labium superius* profunde bifidum vel duabus compositum laminis ovalibus; labium *inferius* bifidum, lateraliter productum et acuminatum. *Maxillæ* bilaminares, forma vulgari. *Pedes maxillares* palpo brevi quadriarticulato. *Pedes thoracici* primi et secundi paris validissimi, manu instructi subcheliformi. *Pedes tertii et quarti paris* articulo primo latissimo, laminari; articulo quarto obcordato, laminari, manum præbente, cujus ungvis ellicitur articulo qvinto subconico articuloque sexto aciculari. *Pedes qvinti sextique* paris minutissimi sed robusti, recurvati, articulo primo clavato, ungve furcato. *Pedes septimi* paris graciles, recurvati, articulo primo laminari, ungve minutissimo, furcato. *Pedes abdominales* primi, secundi et tertii paris natatorii, breves, validissimi, parte basali latissima, rhomboidali; pedes quarti quintique paris saltatorii; pes abdominalis sexti paris natatorius, unica instructus lamina terminali."

"Animal tubum inhabitat, e lapillis fragmentisque concharum formatum."

The type-species is described under the name of *Siphonoecetes typicus*, Tab. vii. fig. 4, a–f. Boeck thinks that Krøyer has been led to describe the upper lip erroneously, by confusing it with the lower lip. Boeck also says that Krøyer's figure of the last uropods is incorrect, as he draws them with two small rami, though in fact there is but one, the prolongation of the peduncle on the inner side giving the appearance of a second. In the present work the last uropod is not figured, Boeck must therefore be referring to the Voy. en Scand., pl. xx. fig. 1., in forgetfulness that Krøyer has here described the uropod in question just as Boeck himself does, but with the additional observation that, "Den fremspringende Vinkel er iøvrigt ved en skraastribe afsat fra den øvrige Roddeel, og kunde maaskee saaledes antyde den ikke fuldt sondrede indre svømmeplade." It is this appearance, not a second ramus, that is shown in the Voy. en Scand., pl. xx. fig. 1 u. Krøyer places the genus nearer to *Corophium* than to *Crapus*, and is followed in this view by Dana and Boeck.

He next describes *Glauconome leucopis*, n. s., Tab. vii. fig. 2, a–e, as type of a new genus, *Glauconome*, which he considers near to *Ischyrocerus*, these two genera in his opinion uniting the *Gammarina saltatoria* and *Gammarina gressoria*. He thus defines *Glauconome*:—

"Antennæ subpediformes; superiores flagello ornatæ appendiculari perparvo. Oculi minuti, parum distincti. Mandibulæ apex in duos fissus ramos, qui dentibus sunt armati conicis; tuberculus molaris dentibus confertissimis instructus. Labium superius breve, depressum, latissimum, margine anteriori medio inciso; labium inferius quatuor compositum laminis setosis. Laminæ maxillares pedum maxillarium dentibus armatæ validis; ungvis palpi apice

setosus. Pes primi paris robustissimus, manu subcheliformi; pes secundi paris gracilior, manu carens subcheliformi; pedes tertii qvartique paris pergraciles; pedes quinti, sexti septimique paris graciles, femoribus parum dilatatis. Pedes abdominales primi, secundi et tertii paris natatorii, breves sed robustissimi; pedes abdominales quarti quintique paris *saltatorii*, validi; pedes sexti paris fere rudimentares, natatorii. Epimera minima, fere evanescentia."

In the description of the species *Glauconome leucopis*, Kroyer says, "*Sjette Par Bugfødder* meget smaa og plumpe; *Roddelen* omtrent to Gange saa lang som den ydre Endeplade, meget bred, i Enden skraat afskaaren i Retningen indad og bagtil; den ydre Endeplade regelmæssigt oval, væbnet i Enden med fem eller sex temmelig lange Borster; den indre Endeplade er endeel mindre end den ydre, stumpt konisk, ligeledes forsynet med et Par Borster." Boeck does not notice this detailed description, but refers to the figure in the Voy. en Scand., as erroneously giving these uropods with two branches, instead of a single branch and a produced peduncle. S. I. Smith, 1880, on the ground that Boeck had access to Kroyer's types, accepts his correction of Kroyer, and identifies *Glauconome leucopis* with *Cuciola irrorata*, Say. It should, however, be observed that Kroyer's description is extremely precise, and that the figure, Voy. en Scand., pl. 19, fig. 1u, which agrees with it, was not drawn by Kroyer himself, if we may trust the signature "C. Thornam del." at the foot of the plate. In any case, as S. I. Smith observes, the name *Glauconome* is preoccupied, but whether it should be identified with *Cuciola* may still perhaps remain a little doubtful.

Eusirus cuspidatus, n. s., figured pl. vii. fig. 1, a–d., is next described as type of a new genus near to *Gammarus* and *Amphithoë*, and with some approach to *Leucothoë*. The genus *Eusirus* is described as follows:—

"*Antennæ superiores* flagello appendiculari rudimentari, tertioque pedunculi articulo minutissimo, fere rudimentari. *Antennæ inferiores* pedunculo flagelli longitudinem superante. *Maxillæ prioris* paris palpo elongato, acuminato, setoso, cujus articulus primus dimidiam secundi articuli longitudinem superat. *Mandibula* parva, apice bifurco, dentato, flabello setarum marginis interioris, tuberculo molari transverse-elliptico dentibus minutissimis confertis formato; palpus triarticulatus duplam fere æquat mandibulæ longitudinem. *Pedes maxillares* laminis maxillaribus minutis, dentatis; palpo maximo, robustissimo. *Pedes thoracici primi et secundi* paris eadem ferme invicem forma et magnitudine, manu armati subcheliformi maxima, laminari, ungve maximo sed gracillimo; articulo antepenultimo prælongo, gracili, postice calcarato, antice ad medium marginem manus anteriorem protento. Pedes thoracici tertii quartique paris pergraciles sed forma vulgari. Sex branchiarum paria (annuli thoracici 2di–7mi). Quatuor laminarum in feminis paria thoracicarum (annuli 2di–5ti). Reliqua ferme ut in genere Gammaro vel Amphithoe."

This genus is placed by Boeck in his subfamily Leucothoinæ.

Dulichia spinosissima, n. s., Tab. vi., fig. 1, a–k, is described as type of a new genus intermediate between the *Gammarina* and *Caprellina*. The genus is thus defined:—

"*Corpus* valde elongatum, gracile. *Antennæ* longissimæ (imprimis superiores), subpediformes; superiores flagello instructæ appendiculari. *Oculi* prominentissimi, acuminati. *Pedes maxillares* forma valde dilatata. *Pedes thoracici primi paris* compressi, manu (articulo quarto) magna, ungveque biarticulato instructi (qvi ungvis articulo quinto sextoque junctis efficitur). *Pedes secundi* paris manu instructi subcheliformi (qvæ apud mares maxima est). *Pedes tertii quartique paris* minimi, fere filiformes, invicem ejusdem [eadem] ferme longitudine et forma. *Pedes quinti, sexti septimique paris* elongati, lineares (femore non dilatato), prehensiles. *Sextus* thoracis annulus cum *septimo* coalitus, ut difficilius distingvantur. *Epimera* nulla vel prorsus rudimentaria. *Abdomen* quinque modo compositum annulis et quinque præditum pedum paribus, quorum tria anteriora natatoria, duo posteriora saltatoria sunt."

To receive this genus Dana instituted the family Dulichiidæ, in 1849. *Stegocephalus inflatus*, Kroyer, is next described in detail. This is now known as *Stegocephalus ampulla*, Phipps, 1774.

Pontoporeia femorata, Kroyer, is here next described in detail, but without any reference to the curious dorsal process which is represented in the Voy. en Scand. pl. 23, figs. 2a, 2y., on the observation of which Bruzelius established a new species, *Pontoporeia furcigera*, which, according to G. O. Sars, is not distinct from *Pontoporeia femorata*.

Descriptions are next given of *Leucothoe glacialis*, Kroyer, Tab. vi. fig. 2, a–f, *Leucothoe clypeata*, Kroyer, Tab. vi. fig. 3, a–g, "*Phoxus Holbölli* Kr." and *Phoxus plumosus*, Kr., now known respectively as *Metopa glacialis*, *Metopa clypeata*, *Phoxus holbölli* and *Harpinia plumosa*. Kroyer himself was inclined to regard the two latter as generically distinct. Of both species he notes that he has never found the maxillipeds united to the head, but always to the first peræon-segment.

Pages 578–637 are devoted to the genus *Anonyx*. Kroyer first discusses and describes at great length what he calls "*Anonyx Ampulla*, Phipps," combining with it "*Cancer nugax*, Phipps??," his own "*Anonyx Lagena* (Hunnen)," *Anonyx appendiculosus* (Hannen), and other synonyms. The species which he here describes, which he figures in the Voy. en Scand., pl. 13, fig. 2, a–z, and which does in fact include the species of *Anonyx* just mentioned, is now known as *Anonyx nugax*, Phipps, while the *Cancer ampulla* of Phipps, figured here pl. vii. fig. 3, a–g, and in the Voy. en Scand., pl. 20, fig. 2, a–t., as *Stegocephalus inflatus*, Kr., is now known as *Stegocephalus ampulla*, Phipps.

A full description is next given of "*Anonyx Vahlii* Kr." which Milne-Edwards had transferred to *Lysianassa*, and which Boeck calls *Socarnes vahli*.

Anonyx gulosus, n. s., is described, with a note that "Fabricius's *Oniscus Cicada* seems in many, if not in all, respects to come very near to it, and is obviously in any case an *Anonyx*."

Anonyx litoralis, n. s., is next described. This was made by Boeck type of a new genus *Onesimus*, which he thinks possibly a synonym of Milne-Edwards' *Alibrotus*, to which Spence Bate had previously referred the *Anonyx litoralis* of Kroyer.

A species, to the young and sexes of which Captain Holboll had given three separate manuscript names, *velutus*, *ornatus*, and *brevipes*, is next described as *Anonyx plautus*, n. s. This also is placed by Boeck in his genus *Onesimus*. Figures of the various species above mentioned are given in the Voy. en Scand.

1845. Milne-Edwards, and Lucas.

D'Orbigny, Alcide, Voyage dans l'Amerique méridionale exécuté dans le cours des années 1826, 1827, 1828, 1829, 1830, 1831, 1832, et 1833. Vol. VI. Animaux articulés. Crustacés par MM. Milne-Edwards et H. Lucas.

No Amphipoda are mentioned in this report, so far as I can perceive. It was perhaps included in Boeck's list under some misapprehension.

1846. Dana, James Dwight, born February 12, 1813 (S. I. Smith).

Notice of some Genera of Cyclopacea. Silliman's American Journal. March, 1846. Also Annals of Natural History. Vol. XVIII. 1846. pp. 181–185.

This article is prefaced by the following classification of Crustacea :—

CRUSTACEA.

Subclassis I.	Subclassis II.			Subclassis III.
PODOPHTHALMIA.	EDRIOPHTHALMIA.			MANDYATA
Ordo 1. Decapoda.	Ordo 1. Choristopoda.			
Tribus 1. Brachyura. 2. Anomoura. 3. Macroura.	Tribus 1. Isopoda. 2. Læmipoda. 3. Amphipoda.			
Ordo 2. Schizopoda.	Ordo 2. Entomostraca.			
	Subord. 1.	Subord. 2.	Subord. 3.	
	Gnathostomata.	Cormostomata.	Merostomata.	
Tribus 1. Stomapoda. 2. Diploöpoda.	Tribus 1. Branchipodacea. 2. Limnadiacea. 3. Daphniacea. 4. Cyclopacea. 5. Cypridacea.	Tribus 1. Caligacea. 2. Lernæacea. 3. Nymphonacea.	Tribus 1. Limulacea.	Tribus 1. Cirripeda, or Balanacea.
	Ordo 3. Trilobita.			

1846. Krøyer, Henrik.

Karcinologiske Bidrag. Fortsættelse. Naturhistorisk Tidsskrift. Ny Række. II. Kjobenhavn, 1846. pp. 1–88, 115–123.

In this continuation Kroyer first describes "*Anonyx Edwardsii*," n. s. ♀. This is transferred by Boeck to *Onesimus*, and distinguished from the species called "*Anonyx Edwardsii*, Kr.," in the Brit. Mus. Catal., p. 73.

"*Anonyx Holbölli*," n. s., next described, is made by Boeck the type of a new genus, *Hippomedon*.

The next species, *Anonyx tumidus*, n. s., is made by Boeck the type of another new genus, *Aristias*.

Anonyx minutus, n. s., is transferred by Boeck to his genus *Orchomene*.

Anonyx nanus, n. s., is made by Boeck the type of a new genus, *Tryphosa*.

Figures are given of these five species in the Voy. en Scand.

From the species of *Anonyx*, Kroyer passes on to the nearly related form *Opis*, since called *Opisa*, and now describes in detail under the name "*Opis typica*, Kr.," what he had previously described in brief as "*Opis Eschrichtii* Holbl." He explains that Holboll had given the name "*Anonyx Eschrichtii*" and three other names to what were only varieties, sexual or otherwise, of a single species; Kroyer himself therefore thought proper to unite them under the name *Opis typica*. But the name "*Opis Eschrichtii*" already published

must take precedence. The Brit. Mus. Catal. gives them as two separate species, though Krøyer's descriptions are identical, so far as the shorter one extends.

Remarks on the habits of animals belonging to the genera *Anonyx* and *Opis* are quoted from Holbøll. These are followed by an account of *Microcheles armata*, supposed to be a new species and type of a new genus *Microcheles*, thus defined :—

"Primum secundumque *pedum thoracicorum* par exilia, linearia, *chelis* armata minutissimis. *Mandibula* parva, apice bifurcato, non vero dentato; palpo triarticulato; tuberculo molari proprio nullo, ante palpum vero corpore instructa claviformi, dentato. *Labium inferius* quatuor constans laminis fere æqualibus, cornubusque lateralibus sat magnis. *Pedes maxillares* laminis maxillaribus magnis, palpo brevi, *triarticulato* (ungve destituto). *Epimera* magna; paria quatuor anteriora inferius in angulum acutum producta. *Pedes abdominis saltatorii* elongati, gracilesque. *Antennæ* forma ferme vulgari, superiores flagello appendiculari destitutæ."

The species, *Microcheles armata*, is figured in the Voy. en Scand., pl. 11 B, fig. 2, *a–c*. It was subsequently identified by Liljeborg with the earlier *Iphimedia obesa* of Rathke, so that both the generic and specific names used by Krøyer take rank as synonyms.

Amphithoe albomaculata, here described as new, is by Boeck identified with *Amphithoë podoceroides*, Rathke, and is therefore probably not more than a colour variety of *Amphithoë rubricata*, Montagu.

Next, "*Amphithoe Edwardsii*" is described, under the name which Owen gave to the "*Talitrus Edwardsii*" of Sabine, which is identical with *Oniscus aculeatus*, Lepechin. See Note on Lepechin, 1780.

Lastly, *Acanthonotus tricuspis*, n. s., is described, pages 115–123. This species was afterwards by Boeck made the type of his genus *Cleippides*. The species included in this continuation are all figured in the Voy. en Scand. For the benefit of any one unacquainted with the alphabetical order used in the Scandinavian languages, it may be pointed out that in the Indices to Krøyer's papers, the diphthong æ and the symbol ö or ø follow the letter z.

1846? KRØYER, HENRIK.

Voyages de la commission scientifique du Nord; en Scandinavie, en Laponie, au Spitzberg et aux Ferö, pendant les années 1838–1840, sur la corvette la Recherche, commandée par M. Fabvre. Publiés par ordre du Roi sous la direction de M. Paul Gaimard. 17 vols. Paris, 1842–1848. 8°. Atlas, fol. undated.

The reputed date of publication is 1846, for the Atlas of Crustacés. It consists of plates for which no text was ever published, and is attributed by repute to Krøyer. W. Thomson, in 1847, refers to the plates as Krøyer's. Brandt, in 1851, compliments Krøyer on figures of *Anonyx* in this Atlas, "Livr. 37–41 auf. Pl. 13–18 meisterhaft von ihm dargestellt." The beautiful figures agree with the elaborate descriptions which Krøyer gave from time to time in his Naturhistorisk Tidsskrift, but the plates which appeared occasionally in that magazine have none of the artistic pretensions of those in the Voyages. As Krøyer's own name nowhere appears in the present work, it may be presumed that he was not the draughtsman, but the editor, who supplied the dissections and supervised the delineations. The Amphipoda figured are named as follows :—Pl. 10. *Amphitoe edwardsii*, Sab.; *Amphitoe pulchella*, Kr. sp. n. Pl. 11. *Amphitoe carinata*, Kr.; *Amphitoe panopla*, Kr. Pl. 11 B. *Amphithoe albomaculata*, Kr. nov. Sp.; *Microcheles armata*, Kr. nov. gen. et Sp. Pl. 13. *Anonyx littoralis*, Kr, Nov. Sp.; *Anonyx ampulla*, Phipps. Pl. 14. *Anonyx rahlii*, Kr. ♂ et ♀.; *Anonyx gulosus*, Kr. nov. sp. Pl. 15. *Anonyx holbolli*, Kr. nov. sp.; *Anonyx plautus*, Kr. nov. sp. Pl. 16. *Anonyx edwardsii*, Kr. nov. sp.; *Anonyx tumidus*, Kr. nov. sp. Pl. 17. *Opis typica*, Kr.; *Anonyx nanus*, Kr. nov. sp. Pl. 18. *Acanthonotus tricuspis*, Kr. nov. sp.; *Anonyx minutus*,

Kr. nov. sp. Pl. 19. *Glaucothoe leucopis*, Kr. nov. sp.; *Ensirus cuspidatus*, Kr. nov. gen. sp.; *Eginа* (?) *longispina*, Kr. nov. sp. Pl. 20. *Siphonoecetes typicus*, Kr. nov. gen. et sp.; *Stegocephalus inflatus*, Kr. Pl. 22. *Dulichia spinosissima*, Kröyer; *Leucothoe clypeata*, Kr.; *Leucothoe glacialis*, Kr. Pl. 23. *Ampelisca* [*Ampelisca*] *gaimardii*, Kr. nov. sp.; *Podoprion femorata*, Kr. Pl. 24. *Caprella hystrix*, Kr.; *Cercops holbölli*, Kr.; *Egina longicornis*, Kr. Pl. 25. *Podalirius typicus*, Kr.; *Caprella septentrionalis*, Kr.; *Caprella lobola* [*lobata*], Mull. ♂, ♀ et Var. All these are described in the Naturh. Tidsskr. except *Amphithoë pulchella* (which Bruzelius assigned to *Paramphithoë*, and Boeck transferred to *Pleustes*, Sp. Bate), and "*Ampelisca Gaimardii*" (which Boeck in 1870 transferred to a separate genus, as *Byblis gaimardi*).

Plates 10, 11, 11 B, 18, are inscribed "C. L. Petersen del.," the others "C. Thornam del.," except pl. 23, of which the draughtsman is not mentioned.

1846. Müller, Friedrich.

Ueber *Gammarus ambulans*, Archiv f. Naturg. 12 Jahrg. 1846, pp. 296–300. T. x. Fig. A–C.

This species Axel Boeck (De Skand. og Arkt. Amph. p. 52) proposed to refer to the genus *Crangonyx*, Sp. Bate, but Aug. Wrześniowski, after detailed comparison of Müller's description of *Gammarus ambulans* with his own species, decides that Müller's species must stand as *Goplana ambulans* in the new genus along with *Goplana polonica*. The points which distinguish *Goplana polonica* from *Goplana ambulans* are perhaps due rather to age than to difference of species. Müller gives the following diagnosis of his species:—"Gammarus ambulans, fronte inermi, oculis subrotundis, antennis superioribus inferiores excedentibus, flagello auxiliari minimo biarticulato instructis, dorso lævi, pedibus spuriis paris sexti simplicibus, conicis, perexiguis, appendicibus caudæ duabus, brevibus, cylindricis, apice spinulosis. Long. 2‴, antennar. sup. 0·8‴."

1847. Allman, George J.

Biological Contributions. No. II. *On* Chelura terebrans, *Philippi, an Amphipodous Crustacean destructive to submarine timber-works.* The Annals and Magazine of Natural History. No. 128. June 1847. Vol. XIX. London, 1847, pp. 361–370. Plates XIII. XIV.

The characters of the genus, of which Philippi gave no detached summary, are thus drawn out:—"Chelura, Phil. Gen. Char. *Body* not compressed. *Head* distinct. Superior *antennæ* shorter and more slender than the inferior, and consisting of a peduncular portion which supports two unequally developed rami; inferior *antennæ* large, not divisible into a distinct peduncle and ramus. *Mandibles* strong, palpigerous, furnished with a molar tubercle with transverse ridges. First pair of *maxillæ* strong, pyramidal, palpigerous; second pair lamelliform. *Maxillary feet* large, bearing a palp-like stem, and united at their origin so as to constitute a great opercular lip covering all the other organs of the mouth. *Thorax* composed of seven distinct segments with the epimeræ distinct and moderately developed. First two pairs of *thoracic feet* didactyle, five remaining pairs terminated by a small unopposable claw. First three segments of *abdomen* each bearing a pair of biramous natatory feet, remainder of abdomen consisting of one very large trunk supporting anteriorly a pair of large foliaceous lobed appendages and a pair of cylindrical false feet, and terminated

posteriorly by two lamellar leaping organs and an intermediate leaf-like lobe." Reference is made in a note to the researches of Erichson (Entomographia) which would displace the use of the terms thorax and abdomen as applied by carcinological writers. In the specific description, he says that the superior antennæ "consist of a peduncular portion which is composed of three hirsute articulations, the last of which supports two rami of very unequal development," remarking in a note that "this condition of the superior antennæ is not described by Philippi." He mentions the name *destructor*, which he had given to his Irish specimens, before becoming acquainted with Philippi's account, in case after-investigation should show the Irish form to be in fact distinct from the Adriatic species. In describing the appendages of the terminal segment of the abdomen, he says "the appendages of the third pair constitute a sort of tail, by which the body is prolonged backwards; they are borne upon the posterior extremity of the segment, and consist each of a very large leaf-like lamina supported on a short basal joint;" adding in a note that, "it is these basal joints of the two caudal appendages which Philippi seems to have mistaken for a fifth abdominal segment, with the anus in a fissure on the back."

He considers that "the families of the Amphipodous Crustacea may be analytically arranged as follows:—

		Family.
"Fourth and fifth abdominal segments confluent. Abdominal appendages of the fourth and fifth pair very different in form (heteromorphous). . .		Cheluridæ.
"Fourth and fifth abdominal segments distinct. Abdominal appendages of the fourth and fifth pair nearly similar in form (isomorphous).	Mouth concealed by the maxillary feet. .	Gammaridæ.
	Mouth not concealed by the maxillary feet.	Hyperidæ."

1847. Brandt, Johann Friedrich, born 1802 (Hagen).

Ueber den gleichzeitig mit der Ausrottung der Pflegemutter bewerkstelligten geschichtlich nachweisbaren Untergang einer kleinen parasitischen Krebsart (Cyamus? oder richtiger vielleicht Sirenocyamus? Rhytinæ) und eines Eingeweidewurmes der Jetztwelt, von J. F. Brandt. (Lu le 20 mars 1846). Bulletin de la classe physico-mathématique de l'Académie impériale des sciences de St.-Pétersbourg. Tome cinquième. St.-Pétersbourg, 1847.

This paper, though earlier published, was originally read after the more full account published in the Mém. de l'Ac. imp. de St. Petersbourg, 1849. See note under that date. Brandt thinks that the want of the breathing appendages, which could scarcely have escaped so accurate an observer as Steller, had they been as strikingly developed as in *Cyamus*, points to an affinity between "*Sirenocyamus?*" and *Leptomera*.

1847. Frey, Heinrich, and Leuckart, Rudolph.

Beiträge zur Kenntniss wirbelloser Thiere mit besonderer Berücksichtigung der Fauna des norddeutschen Meeres. Von Dr. Heinrich Frey und Dr. Rudolph Leuckart. Mit zwei Kupfertafeln. Braunschweig, 1847.

Pages 100–109 are "Ueber den Bau der Caprellen." The authors object to Krøyer's proposal to make the order of Læmodipoda a family among the Amphipoda. They refer to Naturh.

Tidsskr. iv. p. 141, but their reference should have been to p. 492. For their own investigations they used "Caprella linearis Müll. and Podalirius typicus Kröy.," especially young specimens, for the sake of their transparency. The error of their opinion that *Caprellæ* never swim is pointed out by Dohrn, 1866. Their statement that "das Ganglion des zweiten Ringes, des Mesothorax, übertrifft an Mächtigkeit alle übrigen, wie das diesem angehörende Greiffusspaar die stärkste Extremität des ganzen Körper ist," is approved by Mayer on the general principle that the size of the ganglia depends, as might be expected, on the extent of the regions they have to provide for. In regard to the heart they say, "an ihm bemerkt man seitlich fünf paarige, mit Klappen versehene Spaltöffnungen. Das erste Paar liegt ganz am Anfang des Herzens, also noch im Kopfsegmente, das letzte Paar ganz an seinem Ende, also im sechsten Ringe. Die drei übrigen Paare sind so vertheilt, dass die eine Spaltöffnung am hinteren Theile des zweiten, die andere in der Mitte des vierten Ringes liegt, und endlich noch ein Paar Spaltöffnungen gerade am Uebergange des vierten in das fünfte Segment, also unterhalb der Conjunctiva beider Ringer, befindlich ist." For the correction of this view, see note on Delage, 1881. Delage attributes to these authors, among some errors and defects, "le fondement de ce que nous savons aujourd'hui sur la circulation des Caprelles."

To the Amphipoda they attribute seven instead of five pairs of lateral slits in the heart, although three would have been sufficient for the Caprellæ as well as the (other) Amphipoda. They consider that the so-called branchiæ in the Caprellæ are not sufficient to discharge the whole function of respiration, and that probably the legs and antennæ take a share in it.

Pages 136–168, "Verzeichniss der zur Fauna Helgoland's gehörenden wirbellosen Seethiere," are due to Dr. Leuckart alone. Among the Arthropoda, Crustacea *Malacostraca*, he enumerates the following Amphipoda:—"Talitrus saltator (Montag.) Milne Edw.—Orchestia littorea Leach.—O. sp. dub.—Gammarus locusta Fabr.—G. elongatus n. sp.—G. Sabini Leach.—G. angulosus Rathke.—Melita palmata (Mont.) Leach.—Iphimedia obesa Rathke [Köllik.]—Amphitoe podoceroides Rathke.—A. gibba n. sp.—Podocerus capillatus Rathke.—P. calcaratus Rathke.—Metoecus medusarum Kröy."—"Caprella linearis (Lin.) Latr.—Podalirius typicus Kröy."

The doubtful *Orchestia*, which he thinks may be "Orchestia Bottæ," Milne-Edwards, is obviously, as Boeck observes, only a young *Orchestia (littorea) gammarellus*. The *Gammarus elongatus*, n. sp., not mentioned in the Brit. Mus. Catal., is a little doubtfully united by Boeck with *Mæra longimana* (Leach) Thompson. In describing *Melita palmata*, Leuckart suggests that *Gammarus dugesii*, Milne-Edwards, is the same species, a view adopted by subsequent authors. He says that *Amphitoe gibba*, n. sp., "is distinguished from the nearly related A. norvegica Rathke and A. Rathkii Zadd., by the fact that the second, third and fourth segments of the postabdomen in the front half are narrowed, while projecting (buckelförmig) in a hump in the hinder half, giving the part of the body in question a peculiar appearance." None the less, or one might say, all the more, Boeck identifies it with *Calliopius lævisculus*, Kroyer. Leuckart recognises that *Podocerus* has a minute accessory appendage on the upper antennæ. He agrees with Kroyer in supposing that the fifth peræon-segment of *Podalirius typicus* has a (third) pair of branchiæ, misled, Mayer says, by "die weiblichen Geschlechtsklappen."

Among works consulted, Leuckart mentions "Kölliker (Beiträge zur Kenntniss der Samenthissigkeit wirbelloser Thiere. Berlin 1841)." In this treatise perhaps would be found a reason for the addition of Kolliker's name to Rathke's as an authority for *Iphimedia obesa*.

1847. Koch, C. L. See Note on Koch, 1835.

1847. Nardo, Giovanni Domenico, died 1877 (E. v. Martens).

Sinonimia moderna delle specie registrate nell' opera intitolata : Descrizione de' Crostacei, de' Testacei e de' Pesci che abitano le lagune e golfo veneto rappresentati in figure, a chiaro-scuro ed a colori *Dall' Abate* Stefano Chiereghini Ven. Clodiense applicata per commissione governativa dal Dr. Gio. Domenico Nardo. Venezia, 1847.

Nardo says that Chiereghini's work occupies twelve volumes, nine of plates, and three of text. The index to the Crustacea is in the first volume, and the figures of them are in the second. The portion applying to the Amphipoda, with Nardo's synonymy, is given as follows :—

"Sp. 58, f. 74. Can. [Cancer] locusta, *L.* volg. *Saletto de' Fosso.* *Orchestia littorea*, L.

"Sp. 59, f. 75. Can. Salectus, *Ch.* volg. *Saletto de Mar.* *Orchestia ?*

"Macrourus, articularis, testa perpendiculariter subtruncata, fronte mucronato; pedibus decem absque manibus.

"Trovato ne' fondi fangosi del mare.

"Sp. 60, f. 76–79. Can. Algensis, *Ch.* . . . *Lusyta algensis*, Ch., Nardo. an. n. g. Mss.

"Macrourus, thorace rostrata, manibus duabus adactylis, pedibus decem, extremitate caudæ trifida.

"Trovato copiosamente in laguna, nidulato sulle foglie della zostera alla maniera delle Friganee.

"Sp. 61, f. 80. Can. linearis, *L.*, ... *Caprella*, n. sp.?

"Sp. 81 [61], f. 81–82. Can. Varietas linearis, *Ch.*, . . *Caprella*, n. sp.?"

For a little additional light on these species, see Note on Nardo, 1869.

1847. Schiødte, Jorgen Christian, born April 20, 1815, died April 21, 1884 (R. Bergh).

Undersøgelser over Huledyrene i Krain og Istrien. Oversigt over det Kgl. danske Vidensk. Selskabs Forhandlinger for 1847, Kiobnhavn. pp. 75–81.

Boeck says that in this paper, page 81, Schiodte gives a short diagnosis of *Gammarus stygicus* [? stygius], which later became type of the genus *Niphargus*.

1847. Thompson, William.

Note on the Teredo norvegica (T. navalis, *Turton, not Linn.*), Xylophaga dorsalis, Limnoria terebrans *and* Chelura terebrans, *combined in destroying the submerged wood-work at the harbour of Ardrossan on the coast of Ayrshire.* The Annals and Magazine of Natural History. No. 132. Sept. 1847. Vol. XX. London, 1847. pp. 157–164.

He observes that *Chelura terebrans*, Philippi, was known to Leach, who had labelled specimens as *Nemertes nesæoides*, a name adopted by White in his "List," etc., 1847. Both *Nemertes* and *Chelura*, he observes, are preoccupied as generic names. The habits of the species are discussed, and its powers of surviving out of sea-water. Scudder only gives two uses of *Chelura*, viz., "Chelura Phil. Crust. 1839. A," and "Chelura Hope. Lep. 1840. A."

1847. Thompson, William.

Additions to the Fauna of Ireland. The Annals and Magazine of Natural History. Number cxxxiii. pp. 237–250. Vol. XX. London, 1847.

In the order Amphipoda he mentions the following:—"6. *Orchestia*, (sp.), Bangor, Co. Down, 1835, W. T.; distinct from *O. littorea*." "7. Amphithoë fucicola, Leach (sp.)," with a reference to *Pherusa fucicola*, Leach. "8. Amphithöe rubricata, Mont. (sp.)." "9. *Amphithoë*, sp. Bangor, Co. Down, 1835, W. T.; distinct from the preceding and *A. obtusata*, on comparison with the specimens in the British Museum." "10. *Gammarus marinus*, Leach." "11. *Gammarus rampylops*, Leach." "12. *Gammarus longimanus*, Leach (sp.). *Mæra longimana*, Leach MSS." "13. *Gammarus punctatus*, Johnst. Zool. Journ. vol. iii. pp. 177, 490. I found in a case formed by itself among the branches of *Corallina officinalis* growing in pools between tide-marks at Springvale, Co. Down, in July 1846. The species was determined by comparison of mine with those from Berwick presented by Dr. Johnston to the British Museum." "14. *Opis typica*, Kroyer." "15. *Anonyx* (Kroyer) sp." It is distinct, he says, from the species described by Kroyer, and "although a proper description cannot (on account of the state of my eyes) be drawn up, some idea may be given of this *Anonyx*—(which is well worthy of the name of *elegans*)—by the following note:—length of body 6 lines; of upper antennæ 1 line; of lower antennæ 4 lines; general colour yellowish pink; eyes red; lateral or abdominal plates adorned with scarlet stellate markings, of which there are five or six on those nearest the head; they become gradually fewer on those towards the tail, so that not more than one appears on the hinder plates. These markings render it very beautiful. My *Anonyx* is distinct from a British species (locality unknown) in the collection of the British Museum." "16. *Anonyx*, genus?, or rather a form between it and *Stegocephalus*, Kroyer, was dredged from a depth of twenty-three fathoms (shelly sand) in Belfast Bay in Oct. 1846 by Mr. Hyndman." "17. *Ceraptus falcatus*, Mont. (sp.), Linn. Trans. vol. ix. t. 5. f. 2. *Jassa pelagica*, Leach." "18. *Hyperia galba*, Mont. (sp.)." "19. *Hyperia Latreillii*, Edw." "20. *Lestrigonus*, sp."

In the "Order Læmodipoda" he mentions "21. '*Caprella lobata*, Müll.,' Kroyer, Voy. Scand. et Lapon. Crust. pl. 25. f. 3*a*†, dredged Oct. 1839." The note † says, "3*b* presents a very different form, but is considered a variety only." "22. *Caprella tuberculata*, Goodsir, Edin. New Phil. Journ. vol. xxxiii. p. 188, pl. 3. f. 6. specimens taken with the last. Guérin in his Iconographie, &c. pl. 28. f. 1. represents a species which he calls by this name; it is from the Mauritius (Texte Descrip. Crust. p. 24)." "23. *Caprella acuminifera*, Leach." "24. *Ægina? longispina*, Kroyer, Voy. Scand. &c. Crust. pl. 19. f. 3. (described in Kroyer's 'Naturhist. Tidssk.' 1st binde, 5th hefte, 1845, p. 476). A single individual of this very fine, large and spinous form was taken with the two first-noticed *Caprellæ*. My specimen differs only from that represented by Kroyer in having one or two more spines retrally on the body; it is wholly red like his, and has retained this colour in spirits to the present time. Goodsir's *Caprella spinosa* (Edin. New Phil. Journ. vol. xxxiii. p. 187. pl. 3. f. 1) approaches very near to this species, if it be not the same; it is described as 'having the whole body of a pale white colour.'"

1847. White, Adam.

List of the Specimens of Crustacea in the Collection of the British Museum. Printed by Order of the Trustees. London, 1847.

The book is anonymous, but the introduction, pp. iii.–viii., signed John Edward Gray, says "Great care has been taken by Mr. Adam White in the determination of the species, the

verification of the synonymes, and in arranging them into generic groups, in accordance with the present state of the science." Since, then, the work is due to Mr. Adam White, it is difficult to appreciate the fairness of omitting his name from the title-page. He divides the Malacostraca Edriophthalmata into two orders, Amphipoda and Læmodipoda, the former containing the two families, the Gammaridæ and Hyperiadæ; the latter the two families, the Caprellidæ and Cyamidæ. In the Gammaridæ, after *Talitrus locusta* and *Orchestia littorea*, come the following entries.

"Orchestia Montagui, *Audouin, Expl. Pl. Egypte t.* 11, *f.* 7. *Edwards, Crust.* iii, 17. Orch. littorea, *Rathke, Faun. Crim. t.* 5, *f.* 1–6 (*not Montagu*). Orch. trigonochirus, *Leach, MSS. a.* Sicily. *b.* Malta.

"Orchestia longicornis, *Edw. Ann. Sc. Nat.* xx. 361. *Crust.* iii. 18. Talitrus long., *Say, Journ. Acad. Sc. Phil.* i. 384. Scamballa long., *each* [*Leach*], *MSS. a–e.* U. States (New Jersey). Presented by Thomas Say, Esq.

"Orchestia Deshayesii, *Audouin, Ex. Pl. Egypte*, t. 11, *f.* 8. *Edw. Crust.* iii. 18. Scamballa Kuhliana, *each* [*Leach*], *MSS. a.* British Coast.

"Orchestia gryllus. Talitrus gryll., *Bosc. Crust.* ii. *t.* 15, *f.* 1–2. *Say, Journ. Acad. Sc. Phil.* i. 386. Scamballa Sayana, *each* [*Leach*], *MSS. a–d.* U. States (sandy beaches). Presented by Thomas Say, Esq.

"Orchestia Tristensis. Scamballa Trist., *Leach, MSS. a–d.* I. of Tristan d'Acunha. Presented by Capt. Carmichael."

"Orchestia megalophthalmus. Scamballa meg., *Leach, MSS. a, b*——?

"Orchestia Quoyana, *Edw. Crust.* iii. 19. *Cuv. R. A.* (*Crach.*) *t.* 59, *f.* 4. *a, b.* Male and female. New Zealand. Presented by W. W. Saunders, Esq."

In the Brit. Mus. Catal., 1862, Orchestia trigonocheirus, *Leach MS. B.M.*, is figured and described as a new species; *Orchestia tristensis* is identified with *Orchestia platensis*, Kröyer, 1845, from Monte Video; *Orchestia megalophthalma* is figured and described; and *Orchestia quoyana* is transferred, in agreement with Dana, to *Talorchestia*.

The list continues with Lysianassa Costæ; Dexamine spinosa; "Dexamine? carino-spinosa. Cancer carino-spin., *Turton, Mont. Linn. Trans.* xi. 4.? *a.* Isle of Wight," for which see Note on Turton, 1802. Seven species are assigned to Amphithoe, namely A. rubricata; A. fucicola, with Pherusa fucic., *Leach*, for a synonym; A. obtusata, Melita obtusata, *Leach*; "Amphithoe viridis. Elamis viridis, *Leach, MSS. a.* Sicily." "Amphithoe punctata, *Say, Journ. Acad. Sc. Phil.* i. 383. *a.* U. States, (Great Egg Harbour). Presented by Thomas Say, Esq.;" "Amphithoe truncatipes, *Spinola. a–e.* Italy. Presented by M. Spinola," afterwards figured and described by Spence Bate in the Brit. Mus. Catal. as *Maera truncatipes*, with the remark, "this species may be *Gammarus crassimanus* of Viviani, 'Phosphor. Maris,' etc. p. 10. t. 2. figs. 7 and 8; but not having seen that work I hesitate to do more than suggest the possibility;" and lastly, Amphithoe Edvardsi, *Ross*, Sabine's *Talitrus Edvardsii*, from Spitzbergen, for which see Note on *Ouiscus aculeatus*, Lepechin, 1780.

To *Gammarus* White's list refers 1. *G. locusta*, Fabr.; 2. "Gammarus fluviatilis, *Edw. Crust.* iii. 45. Astacus fluv., *Rœsel. Ins. Bel.* iii. *t.* 52. *Geoffr. Hist. Ins. t.* 21, *f.* 6. Squilla pulex, *De Geer, Mem.* vii. *t.* 33. Gamm. Rœselii, *Gervais, Ann. Sc. Nat. 2nd series*, iv. 128. Gamm. aquaticus, *Leach, Enc. Brit. Suppl.* i. 425. *a–g.* Duddingston. From the collection of Dr. Leach;" 3. *G. fasciatus*, Say, presented by Say; 4. "Gammarus minimus, *Say, Journ. Acad. Sc. Phil.* i. 376. Gam. fasciatus? *Edw. Crust.* iii. 46. *a–f.* United States. Presented by Thomas Say, Esq."; in naming which White followed Milne-Edwards in tacitly assuming that *minimus* was the form which Say intended for the specific designation, not the incorrect *minus* which in fact he printed, and which Spence Bate restores in the Brit. Mus. Catal. p. 221; 5. *G. marinus*, Leach; 6. *G. campylops*, Leach; 7. "Gammarus pulex,

Fabr. Ent. Syst. ii. 516. *Latr. Hist. Nat. Crust.* vi. 316. *Mont. Linn. Trans.* ix. *t.* 4. *f.* 2. *Desm. Cons.* 267, *t.* 45, *f.* 8. Cancer p., *Linn. Syst. Nat. Geoff. Ins. Par.* ii. 667. *a–c.* Ireland. Presented by J. Thompson, Esq.;" 8. *G. Sabinii*, Leach; 9 "Gammarus Boreus, *Sabine, App. to Parry's First Voy.* 229. *Ross's Second Voy. Suppl.* 88. Gammarus arcticus, *Leach, MSS. a. b.* Adult. Baffin's Bay. *c–e.* Young. Baffin's Bay. *f–g.* Spitzbergen. Presented by the Admiralty," a species which Boeck unites with *Gammarus locusta*. 10. "Gammarus ornatus, *Edwards, Ann. Sc. Nat.* xx. 372, *t.* 10, *f.* 9–10. *Crust.* iii. 47. Gamm Redmanni, *Leach, MSS. a–e.* North America. From the collection of Lieut. Redman;" 11. "Gammarus glacialis, *Leach, MSS. a, b.* Spitzbergen;" 12. "Gammarus acanthonotus, *Leach, MSS. a—;*" 13. "Gammarus Zete, n. s. *a, b—;*" 14. *G. mucronatus*, Say, presented by Say, for which see Note on Say, 1818; 15. "Gammarus glaber, *Spinola, MSS. a, b.* Mediterranean. Presented by M. Spinola," a species identified by Sp. Bate with *Lysianassa costæ*, Edw.; 16. *G. grossimanus*, Mont. and 17. *G. longimanus*. For the last two, "Mæra grossim., *Leach*," and "Mæra, longi., *Leach, MSS.*," which White gives as synonyms, are now preferred as the established names, but each with the termination *-manus* rather than *-mana*. By Spence Bate *Gammarus Boreus*, Sabine, is accepted as a distinct species, with *G. glacialis*, Leach, and *G. Arcticus*, Leach, as synonyms, the remark being made that "this species closely resembles *Gammarus ornatus*, from which it appears to differ only in some minute details of the gnathopoda." The Brit. Mus. Catalogue likewise gives as a distinct species, "Gammarus Redmanni, *Leach, MS. B.M.*," with the synonym "Gammarus ornatus, *White, Cat. Crust. B.M.* 1847 (not Edwards)," and the remark, "This species resembles *Gammarus ornatus*, but microscopic examination of the gnathopoda exhibits a distinction."

"After the Gammari the list gives "Vertumnus, Leach. Vertumnus Cranchii, *Leach, MSS. a–d.* Falmouth. From the collection of Dr. Leach," since identified by Boeck with *Epimeria cornigera*, Fabricius, 1779. After *Leucothoe articulosa*, Montagu's Devonshire species, "Leucothoe — *a, b.* Mediterranean (Genoa)," is given. Then come *Cerapus pelagicus*, Edw., identified with *Jassa pel.*, Leach; and *Cerapus falcatus*, as a name for "Cancer (Gammarus) falcatus, *Mont.*," and "Cerapus pelagicus p., *Edw. Crust.* iii. 61. (not Jassa pel., *Leach*)." These are followed by *Podocerus variegatus*, Leach, and *Podocerus pulchellus* (=Jassa pulchella, Leach), all the last four in White's list being now recognised as forms of a single species. *Corophium longicorne*, Latr., is given with various authorities, and the synonyms "Gammarus long., *Fabr. Ent. Syst.* ii. 516. *Roemer. Gen. Ins. t.* 33. *f.* 6. Astacus linearis, *Pennant, Brit. Zool.* iv. 17, *t.* 16, *f.* 31. Oniscus volutator, *Pallas, Spic. Zool.* ix. 59 *t.* 4, *f.* 9." Next is "Nemertes, *Leach*. Nemertes nesæoides, *Leach. a–d.* Britain. From the collection of Dr. Leach," identified by W. Thomson, 1847, with *Chelura terebrans*, Philippi, 1839. *Atylus carinatus*, Fabr., and *Cuciola irrorata*, Say, presented by Say, conclude the Gammaridæ.

The Hyperiadæ are represented by "*Hyperia Latreillii*," Edw., with "*Hiella Orbignii*, Strauss," for a synonym; by *Hyperia galba*, with the synonyms "Cancer (Gammarus) galba, *Mont.*," and "Callianira, g. *Leach*, m. n.;" by *Metoecus cyaneæ*, Edw., with the synonyms "Talitrus Cy., *Sabine*" and "Hyperia Cy. *Edw.*," the whole of which group is united into a single species by Boeck as *Hyperia Medusarum*, O. F. Müller, 1776. Before *Metoecus cyaneæ*, the list gives *Metoecus medusarum*, Kroyer, with the synonym *Oniscus Med.* O. Fabr., for which see Note on Kroyer, 1838. The next species is thus entered, "Primno, *Guerin*. Primno Guerinii. *a.* Atlantic Ocean (S. Lat. 8° E. Long. 46°). Congo Expedition." No notice is taken of this species in the Brit. Mus. Catalogue, where Guérin's type-species, *Primno macropa*, is figured and described. The list next gives *Phronima sedentaria*, Forsk., and *Phronima atlantica*, Guerin; concluding the Hyperiadæ with "Typhis monoculoides. Cancer (Gammarus) mon., *Montagu, Linn. Trans.* ii. [xi.] *t.* 2. *f.* 3. *a.* South coast of Devon.

From the collection of Col. Montagu," and "Typhis— *a–c.* Norfolk (Cromer)." Since the *Typhis monoceuloides* is in point of fact the Gammarid, *Stenothoë monoceuloides*, the *Typhis* from Cromer has but a doubtful claim to that generic title.

The Caprellidæ contain 1. *Caprella linearis*, Latr. Hist. Crust. vi. 324, with many other references, the localities assigned for the specimens being "*a.* British Coast. From the collection of Dr. Leach. *b–d.* Firth of Forth. Presented by H. Goodsir, Esq., Surg. R.N."; 2. *Caprella lævis*, Goodsir; 3. *Caprella acuminifera*, Leach, *Desm. Cms.* 277. *Edw. Crust.* iii. 107. *t.* 33, *f.* 1. *Quercnic, Mem. Sav. etr.* iii. 329. *f.* A. *B.*; 4. *Caprella acutifrons*, Desm., with *C. atomos*, Leach, for a synonym; 5. *Caprella phasma*, Montagu's species; 6. *Caprella tuberculata*, Goodsir, with the synonym "C. tuberculata, *Guerin, Icon. t.* 28. *f.* 1?"; 7. *Caprella geometrica*, Say; 8. *Caprella equilibra*, Say; the two last presented by Say. These are followed by "Proto, *Linn.* Proto pedatum, *Leach. Linn. Trans.* xi. 362," with "Gammarus ped., *Muller*," and "Leptomera ped. *Guer.*" for synonyms; on which it should be noticed that the genus *Proto* was instituted by Leach, while the species is properly *Proto ventricosa*, O. F. Müller.

To the family Cyamidæ are assigned tive species of *Cyami*, 1. *Cyamus erraticus*, Rouss. with the synonyms *Oniscus ceti*, L.; *Squilla c.*, Degeer; *Cyamus c.* Latr.; *Panope c.*, Leach; *Larunda c.*, Leach; 2. *Cyamus oralis*, Rouss.; 3. *Cyamus gracilis*, Rouss., all these three being said to come from British Seas. No. 4 is mysteriously represented by "Cyamus—*a.*—." No. 5 is *Cyamus abbreviatus*, Say, from North America. Presented by Say.

On p. 130, among the additional species are given, "Ephippiphora, White. Ephippiphora Kroyeri, n. s. *Zool. Ereb. and Terr. t. f. a.* Tasmania," and "Rhabdosoma, *Adams and White.* Rhabdosoma armatum. Oxycephalus arm. *Edw. Crust.* iii. 101. *a.* Indian Ocean. Presented by Capt. Sir Edw. Belcher, C.B., R.N."

1847. WHITE, ADAM.

Descriptions of new or little known Crustacea in the Collection at the British Museum. Proceedings of the Zoological Society of London, July 27, 1847. Part XV. 1847. Also in the Annals and Magazine of Natural History. Vol. I. Second Series. Number III. pp. 221–228. London, 1848.

In the "Order Amphipoda, Family Gammaridæ," White thus describes his genus *Ephippiphora*:—

"Head rather large; antennæ distant from each other, the upper pair with the basal joints very thick and corneous, inserted in a deep notch in front of head; two setæ at the end of each, the outer the thicker. Lower pair of the antennæ with the basal joint somewhat elongated and furnished with hairs.

"Body much compressed, the lateral appendages on the first eight joints very large, and nearly concealing the legs; the appendage of the fourth joint much dilated behind at the end; eighth to eleventh joints slightly keeled on the back; appendages of the three last joints of abdomen longish, with short spines on the edge behind.

"A genus allied to *Orchestia* and *Talitrus*."

"EPHIPPIPHORA KROYERI, White, List. p. 130.

"The body is very highly polished, the edges of the segments behind somewhat tinged with yellow; the legs and caudal appendages slightly brownish.

"*Hab.* Van Diemen's Land.

"Named as a small compliment to the very eminent Danish naturalist, whose researches among the less studied orders of Crustacea are so well developed in his published but not easily accessible works. I regret that, excepting a few foliated plates of the large 'Voyage en

Islanda,' &c., I had not seen any part of them when I prepared the 'List of Crustacea in the British Museum.'"

The account of the upper antennæ shows that White is wrong in allying his new genus to the Orchestidæ; in Boeck's opinion his own *Socarnes* may possibly be a synonym of White's *Ephippiphora*.

1848. Adams, Arthur, and White, Adam.

The Zoology of the Voyage of H.M.S. "Samarang"; under the command of Captain Sir Edward Belcher, C.B., F.R.A.S., F.G.S., during the years 1843–1846. Crustacea by Arthur Adams, F.L.S., and Adam White, F.L.S. London, 1848.

On page 63 is given "Rhabdosoma, *Adams & White*. *Oxycephalus*, M.-Edwards. We regret that the state of the only specimen in the British Museum is such that we cannot give the generic character with that detail which we should wish. It is founded on the third species of Professor Milne-Edwards, indeed Mr. White has the authority of that eminent Crustaceologist that it is his very species; it is so different from the *Oxycephalus piscator*, M. Edwards (Crust. III. p. 100 t. 30. f. 10), that we have traced the figure of *Oxycephalus piscator*, and added it below that of the *Oxycephalus armatus* to show the difference. Someday it may be proved to be a sexual character, when of course our name will sink, but *as yet* we know of no such discrepancies in the sexes of these Crustacea.

"The head is as long as the rest of the body, and ends in a very long beak; from the state of our specimen we cannot describe this, but indicate it on the plate from a drawing made at the time of capture. The immense length of the body and beak would sufficiently mark this generic form. The first two pairs of legs are shown in the figure, which must serve till we can procure further specimens, when we hope to give ample details of this very singular crustacean, and to analyse its characters at length. It forms a singularly interesting link between the *Amphipoda* and *Læmodipoda*, uniting, as it were, the two; we should like to have this form examined particularly by Prof. M. Edwards or Dr. Kroyer.

"Rhabdosoma armatum, *Adams and White*. (Tab. XIII. Fig. 7.) *Oxycephalus armatus*, M.-Edw. Crust. III. p. 101. pl. 30. f. 10, copied. (Tab. XIII. Fig. 8.)

"The specimen described by Professor Milne Edwards was found by MM. Quoy and Gaimard in the Ocean between Amboina and Van Dieman's Land, and is now in the Paris Museum. Ours was taken during a calm, floating on the surface of the South Atlantic Ocean."

1848. Leydig, Franz.

In his Treatise "Ueber Amphipoden und Isopoden," 1878, page 229, note 2, Leydig says that he had already in 1848 described and figured the segmentation-process of *Gammarus*; but he does not say that the account was published, though this would seem to be implied by the context.

1848. Milne-Edwards, H.

Note sur un crustacé amphipode, remarquable par sa grande taille. Annales des sciences naturelles. Troisième Série. Zoologie. Tome neuvième. Paris, 1848.

This note, at page 398, records the finding of an amphipod, with a body 9 cm. long and 3 cm. high, by M. d'Orbigny, who took it from the stomach of a fish caught off Cape Horn. Supposing it to be new, Milne-Edwards names it "*Lysianassa Magellanica*."

It has since been identified with Mandt's *Gammarus gryllus*, and named *Eurythenes gryllus*.

1848. Müller, Friedrich.

Orchestia Euchore und Gryphus, neue Arten aus der Ostsee, beschrieben von Dr. Friedrich Müller. (Hierzu Taf. IV.) Archiv für Naturgeschichte. Vierzehnter Jahrgang. Erster Band. Berlin, 1848.

Müller notices that the genera *Talitrus* and *Orchestia* belong to the warmer seas, and seem to be wanting in the arctic waters, the proper home of the typical Gammarina. From this point of view he thinks the discovery of two new species from the Baltic not without interest. He does not consider the presence of the large second hands in *Orchestia* sufficient for a generic distinction from *Talitrus*, while in the two new species, as in *Orchestia platensis*, Kroyer, the males belong to *Orchestia*, the females to *Talitrus*. *Orchestia euchore* is fully described and figured, but it is, as Boeck says, not to be distinguished from *Orchestia gammarellus*. Müller says that the mandibles are without any trace of a palp, as if he had given special attention to that point. He recognizes the great likeness between *Orchestia gryphus* and *Orchestia deshayesii*, Audouin. In conclusion he says, "*Orchestia platensis*, *Euchore* et *Gryphus* inter se conveniunt:

"*Antennis sup.* capitis longitudinem haud aut vix superantibus; *mandibulis* palpi ne vestigio quidem gaudentibus: *maxillarum paris I* lamina interna angusta setis pinnatis curvatis duabus instructa; palpi *pedum maxillarium* articulo ultimo brevi lato rotundato; *pedibus II paris* in ♂ manu valida instructis, in ♀ debilibus, unguc exiguo articuli V[i] foliaceo-dilatati, cujus margini anteriori inseritur, apicem haud superante præditis; *branchiis I paris* angustis elongatis flexuosis; *pedibus saltatoriis paris ultimi* exiguis conicis, stylo terminali unico donatis; *lamina caudali* unica erassiuscula, spinis ornata.

"Differunt:

"*Orchestia platensis*, Kr. *Antennis superioribus* caput longitudine æquantibus aut vix superantibus; *antennis inf.* vix tertiam corporis partem longitudine æquantibus, pedunculo flagellum 14 articulatum parum excedente; *oculis* ellipticis; *primi pedis* articulo quinto apicem versus in ♂ dilatato, haud dilatato in ♀, ungue valido inermi; manu *pedis secundi* in ♂ lata ovali; *pedis septimi* articulo quarto in ♂ inerassato, in ♀ gracili, *lamina caudali* truncata; longitudine linearum 6.

"*Orchestia Euchore* F. Müll. *Antennis superioribus* caput, *inferioribus* tertiam corporis partem, harum pedunculo flagellum 18 articulatum longitudine æquantibus; *oculis* rotundis; *primi pedis* articulo quinto apicem versus in ♂ dilatato, haud dilatato in ♀, ungue valido spinulis duabus in margine interiore armato; manu *pedis secundi* in ♂ ovali; *pedis septimi* articulo quarto in ♂ inerassato, in ♀ gracili; *lamina caudali* emarginata; long. 5‴.

"*Orchestia Gryphus* F. Müll. *Antennis sup.* capite brevioribus; *inferioribus* in ♂ dimidiam, in ♀ quintam (?) corporis partem longitudine æquantibus, flagello 20 articulato pedunculi dimidiam subæquante; *oculis* rotundis; *primi pedis* articulo quinto nec in ♂, nec in ♀ dilatato, ungue valido spinula unica in margine interiore armato; manu *pedis secundi* lata, incisura profunda in ramos duos divisa, anteriorem longiorem latiorem unguigerum, posteriorem acuminatum; *pedis septimi* articulo quarto in utroque sexu gracili; *lamina caudali* emarginata; long. 4‴."

Another notice, headed "Bemerkungen zu Zaddach's Synopseos Crustaceorum Borussicorum prodromus," states that *Leptocheirus pilosus*, Zaddach, has in fact a very rudimentary, one-jointed accessory flagellum on the upper antennæ, which had escaped the notice of the author of the genus *Leptocheirus*, when the absence of an accessory flagellum was made part of the generic character.

1848. Siebold, Carl Theodor Ernst von, born 1804, died April 7, 1885 (Friedländer, Naturæ novitates).

Lehrbuch der vergleichenden Anatomie der wirbellosen Thiere. Berlin. 1848.

1849. Brandt, Johann Friedrich.

Symbolæ Sirenologicæ, quibus præcipue Rhytinæ historia naturalis illustratur auctore Joanne Friderico Brandt. (Conventui exhib. die 23 januarii 1845.) Appendix II. *De animalculo parasitico peculiari* (*Cyamo ? vel rectius forsan Sirenocyamo ? Rhytinæ*) *in Rhytinæ cuticula a Stellero observato una cum Rhytina et Ascaridibus ejus deleto.* Mémoires de l'Académie impériale des Sciences de Saint-Pétersbourg. Sixième série. Sciences naturelles. Tome V. St.-Pétersbourg. 1849. pp. 153–157.

After quoting Steller's account, Novi Comment. Petropol. t. ii. pp. 298, 324, and 330, and considering how far it agrees or disagrees with the genus *Cyamus*, Brandt continues, "Ad stabiliendam tamen differentiam genericam aliorum Sireniorum ordinis animalium pediculorum cognitio adhuc optanda videtur. Qua de causa pro tempore parasitum Rhytinæ dubitanter (sicuti signum interrogationis indicat) generi Cyamorum quidem inseruimus, sed in parenthesi nomen hypotheticum Sirenocyamus interrogationis signo addito pariter exhibuimus antequam, quæ sequitur, descriptionem ejus in ordinem systematicum redactam proponimus.

"C y a m u s (?) num genus proprium S i r e n o c y a m u s (?) R h y t i n æ.

"Pedes mandibulares biarticulati, extremitate acutissimi et clavati. Pedum thoracicorum sex paria. Pedes thoracali annulo inserti chelis similes, biarticulati. Appendices respiratoriæ a Stellero non descriptæ. (An characteres generis Sirenocyamus ?).

"Characteres specifici.

"Habitus fere, ut videtur, Cyami gracilis. Caput oblongum, acutum. Antennulæ geniculatæ, duæ, breves, 1/2 lineam longæ, e fronte exporrectæ. Annuli corporis pro numero pedum sex, dorso convexi, 1/3‴ lati, a primo ad ultimum annulum (caudam) sensim angustiores. Thoracis annulus sequentibus duplo latior, lentis dimidium referens. Annulus ultimus seu caudalis orbicularis. Pedes (exceptis illis, qui ad latera thoracis erant adnati et chelas crassas, biarticulatas, aculeo flexili firmissime Rhytinæ cuticulæ infixas referebant) graciliores, omnes aculeis præfiniti et sensim breviores; ultimi duo brevissimi ex annulo caudali emergentes corpusculum præfiniebant, ac dum animalculum gradiebatur dirigebant.

"Corpus dimidiam plerumque unciam longum, diaphanum.—Color candidus aut subflavus."

If the creature was correctly observed by Steller, the genuine *Cyami*, Brandt says, differ from it:—"Pedibus mandibularibus [maxillaribus] 5-articulatis, pedum corporis genuinorum paribus quinis, omnibus quinque-articulatis, necnon appendicibus respiratoriis in secundo et tertio corporis annulo pedum loco conspicuis." He thinks that the Rhytina's parasite may have been allied to the *Leptomeræ* rather than the *Cyami*, and contemplates the possibility of finding other *Sirenocyami* still living on other Sirenia.

1849. Caspary, Robert.

Gammarus puteanus Koch. Beobachtet von Dr. Robert Caspary. Mit Abbildungen. Tab. II. Verhandl. I. Naturf. Vereins für Rheinland, Jahrg. 6. Bonn, 1849. pp. 39–48.

In the full and fairly accurate description which Caspary gives, he obviously falls into error when he says that the intestinal canal (der Darm) runs from the head to the tenth segment in which it opens, the tenth segment in his reckoning being the second of the pleon. Of the last three peræopods he says that "das Thier streckt sie über den Rücken hinaus, wie Fig. XIX. zeigt und kriecht, auf dem Rücken liegend, öfters auf ihnen." I think it may be safely said that the creature much more usually crawls with the ventral side downwards, the extremities of these peræopods being extended upwards out of use.

Bate and Westwood are inclined to think "*Niphargus Kochianus*," Sp. Bate, identical with the specimens "described and figured by Caspary and Hosius, referred to in the synonyms under *N. aquilex*." But their *Niphargus kochianus* is expressly distinguished from *Niphargus aquilex* by its second and third pleon segments having the infero-posterior angle acute. Caspary's figure agrees with their *Niphargus aquilex* in having that part rounded.

1849. Dana, James D.

Synopsis of the Genera of Gammaracea. The American Journal of Science and Arts, Second Series, Vol. viii.–No. 22. Nov. 1849. pp. 135–140.

The tribe of Amphipoda here includes the subtribes Gammaracea and Hyperiacea, the former of which consists of six groups or families.

Fam. I. Orchestidæ, with the genera *Talitrus*, Latreille, *Orchestia*, Leach, *Allorchestes*, Dana.

Fam. II. Gammaridæ. Subfam. I. Lysianassinæ, with the genera thus grouped :—

I. a. *Lysianassa*, Milne-Edwards; *Phlias*, Guérin; b. *Stegocephalus*, Kroyer. II. *Opis*, Kroyer; *Uristes*, new. III. *Anonyx*, Kroyer; *Stenia*, new. IV. *Pontoporeia*, Kroyer.

Subfam. II. Gammarinæ, with these groups :—I. *Alibrotus*, Milne-Edwards; *Acanthonotus*, Owen. II. *Leptochirus*, Zaddach. III. A. *. a. *Gammarus*, Fabr.; *Amphithöe*, Leach; b. *Photis*, Kroyer; *Œdicerus*, Kroyer. †. *Leucothöe*, Leach; *Erichthonius*, Milne-Edwards; *Pardalisca*, Kroyer. B. *Ischyrocerus*, Kroyer. IV. A. *Lepidactylis*, Say; *Protomedeia*, Kroyer; *Ampelisca*, Kroyer; *Aora*, Kroyer. B. *Phoxus*, Kroyer.

Subfam. III. Iseinæ. A. *Isæa*, Milne-Edwards; *Anisopus*, Templeton. B. *Laphystius*, Kroyer.

Fam. III. Corophidæ. a. *Cerapodina*, Milne-Edwards; *Cerapus*, Say. b. * *Corophium*, Latreille; *Podocerus*, Leach. † *Unciola*, Say; *Atylus*, Leach. ‡ *Clydonia*, Dana, new.

Fam. IV. Ieilidæ. *Pterygocera*, Latreille; *Ieilius*, new.

Fam. V. Cheluridæ. *Chelura*, Philippi.

Fam. VI. Dulichidæ. *Dulichia*, Kroyer.

Fr. Müller having in 1848 denied the propriety of separating the *Orchestiæ* and *Talitri*, Dana remarks, "There is however a wide difference between the species having a styliform joint terminating the *second pair* of legs and those with a hand however minute or obsolescent. The only safe course appears to the writer to consist in drawing the line between *species having a finger or claw however small or large, closing upon the fifth joint*, and those *species having an extended finger or claw not closing up*."

The new genus *Allorchestes*, identical with *Nicea*, Nicolet, published in the same year 1849, and probably the same as *Hyale*, Rathke, 1837, is thus defined :—"Pedes primi secundique

subcheliformes. Antennæ superiores breviores, basi inferiorum longiores. Maxillipedes ad apicem unguiculati," with the following note, "The species of this genus have the aspect of many Amphithoe, and have probably been hitherto referred to that genus. They have the very short posterior stylets of the Orchestiæ, and resemble them in habit and in the absence of a palpus to the mandible; while they differ in having the superior antennæ *longest* and in the stout spine or claw terminating the maxillipeds. The writer has dissected the mouth of nearly a dozen species of Allorchestes." The italicized word *longest* is no doubt only a slip for *longer*.

The subfamily *Lysianassinæ*, which includes *Uristes* in its second, and *Stenia* in its third division, is defined as having:—"Antennæ superiores ad basin crassæ. Epimera grandia. Pedes sex postici non prehensiles."

The new genus *Uristes* has for its characters "Pedes primi subcheliformes, secundi non subcheliformes; reliqui non prehensiles;" "Antennæ sup. non appendiculatæ. Pedes secundi vergiformes; tertii quartique brevissimi." As pointed out by Spence Bate, it is probably only founded on a misconception.

The new genus *Stenia* is characterised by "Pedes primi secundique subcheliformes, reliqui non prehensiles;" "Antennæ sup. non appendiculatæ." This genus Dana subsequently dropped, as not distinct from *Anonyx*, Kroyer.

The new genus *Clydonia* is placed among those Corophidæ which have "Digiti nulli 2-articulati," and further defined as having "Antennæ longæ, flagello crasso rigidoque, obsoletè articulato." "Antennæ styliformes, rectæ. Pedes filiformes, non prehensiles, sex postici prælongi." Bovallius, 1885, identifies this genus with *Tyro*, Milne-Edwards, 1840.

The new genus *Icilius* is defined simply by the words "Pedes toti vergiformes, nulli prehensiles." Its companion in the Icilidæ, *Pterygocera*, Latreille, "Pedes postici sublamellati," is a synonym of *Lepidactylis*, Say (*Haustorius*, P. L. S. Müller), which Dana places among the Gammarinæ.

Dana observes in his notes that *Mæra* and *Melita* are separated by Leach, and *Amathia* by Rathke, from the genus *Gammarus*, that *Amphithöe* includes the *Dexamine* and *Pherusa* of Leach, that *Eusirus* of Kroyer is not sufficiently distinct even for a subgenus, that Kroyer's *Microcheles*, Rathke's *Iphimedia*, and Owen's *Acanthosoma* are near *Amphithöe*, that *Siphonœcetes* of Kroyer differs from *Podocerus* only in having the posterior legs longer than the four preceding, and that *Glauconome* of Kroyer has the hands and antennæ of *Unciola*.

1849. Liljeborg (subsequently Lilljeborg) Wilhelm, born 1816 (G. O. Sars).

Zoologisk resa i norra Ryssland och Finnmarken. Öfversigt af Kongl. Vetenskaps-Akademiens Förhandlingar. Årg. 6. 1849. No. 1. Stockholm. pp. 16–37.

This letter from Liljeborg to Lovén is mentioned in Boeck's list, but I cannot find that it contains any information about the Amphipoda, or any mention of Crustacea, except the bare fact, p. 32, that at Tromsö in Norway he had observed some which he had not at the time of writing determined.

1849. Lucas, H.

Exploration scientifique de l'Algérie pendant les années, 1840, 1841, 1842. Zoologie. Histoire naturelle des animaux articulés.

In the "Première Classe.—Crustacés. Troisième ordre, les Amphipodes. Première Famille, les Crevettines. Première Tribu, les Crevettines sauteuses," he gives the following species,

103. *Talitrus saltator*, Mont.; 104. *Talitrus platycheles*, Guér.; 105. *Orchestia littorea*, Mont.; 106. "*Orchestia Montagui*," Sav. et Aud.; 107. "*Orchestia Perieri*," n. s.; 108. "*Orchestia Fischeri*," M.-Edw.; 109. "*Lysianassa Costæ*," M.-Edw.; 110. *Lysianassa longicornis*, n. s.; 111. "*Amphithoe Vaillantii*," n. s.; 112. *Gammarus locusta*, Mont.; 113. *Gammarus fluviatilis*, Roes.; 114. "*Gammarus Olivii*," M.-Edw.; 115. *Gammarus peloponnesius*, Guér. In the "Deuxième Famille, les Hypérines. Première Tribu, les Hypérines Gammaroides," he gives 116. "*Vibilia Jeangerardii*," n. s.; in the "Deuxième Tribu, les Hypérines ordinaires," 117. *Phronima sedentaria*, Forsk.; and in the "Troisième Tribu, les Hypérines anormales," 118. *Typhis ovoides*, Risso. In the "Quatrième Ordre, les Læmodipodes. Première Famille, les Caprelliens," he gives 119. *Caprella tabida*, n. s.

Occasional notes are made upon the various species. The new ones are described and figured. "*Orchestia Perieri*," pl. 5. fig. 1, called in the Brit. Mus. Catal., "*Allorchestes Pereiri*," now becomes *Hyale perieri*. *Lysianassa longicornis*, pl. 5. fig. 2, "Long. 10 millim. larg. $3\frac{1}{2}$ à 4 millim.," is thus defined, "antennis primis sat elongatis, primo articulo infra fortiter spinoso; secundis elongatissimis; pedibus spinosis, posticorum primis articulis subtiliter denticulatis." Besides the very pronounced spine at the lower distal end of the first joint of the peduncle of the upper antennæ, we learn that "leur filet accessoire est assez court." "Les yeux sont très-grands et réniformes." The telson is "assez fortement creusé en cuiller et terminé en pointe arrondie postérieurement. Les stylets terminaux des fausses pattes des trois dernières paires sont assez allongées." The highly useful information is also given that, "La première et la seconde paire de pattes ne présentent rien de remarquable." The figure 2*b* shows the upper antenna with a thick first joint having infero-distally a small process and a long spine, the second joint not much shorter than the first, and two and a half times as long as the third. Spence Bate adopts the name for a British species, to which he does not assign any spine on the upper antenna, and of which he says (Brit. Sess. Crust. i. p. 88), "the central tail-piece exhibits no peculiar character." According to G. O. Sars, 1882, *Lysianassa longicornis*, Sp. Bate, is the male of *Anonyx edwardsii*, Sp. Bate, and is renamed "*Orchomene Batei*," G. O. Sars, although the first gnathopods as figured and described by Bate and Westwood do not agree with the definition of the genus *Orchomene*. Heller in 1866 gives a fresh description and figures of *Lysianassa longicornis*, Lucas, with a long process instead of a spine on the upper antennæ. By the antennæ this species approaches Costa's genus *Ichnopus*.

"*Amphithoë Vaillantii*," pl. 5, fig. 3, "Long. 12 à 17 millim. larg. 3 à 4 millim.," is thus defined:—"flavescens, subtiliter viridi punctata; antennis æqualibus, fortiter ciliatis; pedibus primi paris brevibus, secundi paris elongatissimis, penultimo articulo valde emarginato, ad basin spinâ instructo; corpore lævigato." In regard to this species see Note on Prof. Catta, 1876.

"*Vibilia Jeangerardii*," pl. 5, fig. 4, "Long. 10 millim. larg. 3 millim.," is thus defined:—"rubro subtiliter laxèque maculata; antennis primi paris levigatis, anticè obtusè truncatis, secundi paris brevibus; pedibus levigatis, penultimo articulo paulisper arcuato; septimo segmento abdominis suprà trilobato, penultimo anticè transversim depresso." It is near "*Vibilia Peronii*," M.-Edw., but differs from it "par la tête, qui, à son sommet, est moins acuminée; le dernier article des antennes supérieures est aussi plus allongé et surtout beaucoup plus obtusément tronqué à sa partie inférieure que dans la *V. Peronii*." Moreover in *Vibilia jeangerardii* the lower antennæ, he says, are a little more than half as long as the upper, while in the other species they are much longer than the upper antennæ.

Caprella tabida, pl. 5, fig. 6, is identified by Mayer with *Caprella acutifrons*, Latreille.

1849. NICOLET, HERCULE.

Historia fisica y politica de Chile segun documentos adquiridos en esta republica durante doce años de residencia en ella y publicada bajo los auspicios del supremo gobierno por Claudio Gay ciudadano chileno. Zoologia. Tomo tercero. Paris, MDCCCXLIX.

The Crustacea occupy pages 115 to 318 of this third volume. In the first division, "Crustaceos maxilados," the "Anfipodos" and "Locmodipodos" are respectively the third and fourth orders. The Amphipods, pages 226 to 249, include the two subdivisions, "Gamarianos" and "Hiperineas." In the former, *Talitrus chilensis*, n. s., is established on a damaged specimen with the definition, "*T. antennis brevibus; pedibus anterioribus gracilibus; corpore supra leri, ad latera rugoso.*" A new genus follows, thus described :—

"ORQUESTOIDEA.—ORCHESTOIDEA. *Antennæ superiores minimæ, inferiores* [inferioribus] *multo breviores; articulo primo lato, quadriformi, fortiter depresso; secundo gracili, cylindrico; tertio secundo breviori, gracili, cylindraceo, tigilla brevissima, quinque articulata terminato. Antennæ inferiores maximæ, crassissimæ; articulo ultimo pedunculi elongato; penultimo ultimo crassiori, leviter breviori. Oculi magni. Palpus pedum maxillarum externarum quadriarticulatus, parum elongatus, crassus; articulo primo brevissimo; tertio quadriformi, apice truncato, in medio fortiter emarginato, quartoque angusto breri, turbinato. Mandibulæ robustæ, fortiter dentatæ, palpo nullo. Pedes primi paris tarso styliformi terminati; secundi paris subchiliformes manu maxima crassissima, ovata; sequentes unguiculati.*"

The fuller description concludes with the observation, "los apéndices de los anillos abdominales son cortos y bifidos; el ultimo segmento es muy corto y repentinamente replegado por bajo, lo que da á la estremidad posterior del cuerpo un aspecto truncado," to which he appends the remark by way of note, "la forma de las antennas y la del cuerpo de estos Crustaceos representan á los Talitros, mientras que la disposicion de sus patas del segundo par los incorpora á las Orquescias: pero las pata-quijadas esternas y sobre todo la forma de los tallos palpiformes los separan completamente, siendo intermediarios de ambos géneros, con quienes tienen muchas relaciones." The type species, *Orchestoidea tuberculata*, pl. 2, fig. 4, is defined as "*O. flavescens; corpore tuberculato; articulo primo pedunculi antennarum externarum extus bituberculato; fronte in medio leviter angulato; pedibus villosis.*" Nothing is said about the female.

He then describes *Orchestia chilensis*, M.-Edw.; *Orchestia brevicornis*, n. s.; "*Orchestia Gayi*," n. s.; *Amphitoe chilensis*, n. s., pl. 2, fig. 5; "*Amphitoe Gayi*," n. s., pl. 2, fig. 6.

The new genus *Nicea* is thus defined :—"*Antennæ superiores caleris breviores. Caput crassum. Oculi ovati, oblique dispositi. Pedes breves, primi et secundi paris subchiliformes; manibus brevissimis. Mandibulæ brevissimæ, bilobatæ, multidenticulatæ, non palpigeræ. Labium sternale maximum.*" To the general description he adds that he has formed this genus upon a specimen which has various affinities with Amphithoë, but differs in the absence of the mandibular palp and the relative length of the antennæ, bringing it near to *Talitrus*, and above all by the considerable development of the buccal portion and the form of the maxillipeds; its dilated (rechoncho) body resembles that of *Talitrus*. The type species, "*Nicea Lucasii*," pl. 2, fig. 7, is defined "*N. obscure fusco-virescens; corpore brevi, crasso, curvato, convexo; pedibus maxillaribus externis fortiter tuberculatis.*"

He next gives *Gammarus chilensis*, n. s.

This is followed by what Nicolet supposed to be a new genus, *Lalaria*, thus defined:—

"*Antennæ superiores graciles, elongati, articulo secundo pedunculi primo longiore, cylindrico, tertio breri, bitigellato. Antennæ inferiores pedunculo elongatissimo, tigella brevissima.*

Caput brevе, anterius truncatum. Oculi parvi. Mandibulæ palpigeræ, palpo triarticulato, articulo primo brevi, secundo tertioque elongatis, cylindraceis, fortiter ciliatis. Pedes maxillares externi palpis quinque articulatis: articulo ultimo unguiformi. Pedes quatuor primorum parum prehensiles: Pedes primi paris multo longiores, robusti, palpo spiniformi infra muniti; digito elongato, cylindraceo, unguiculato, terminati."

The type-species, *Lalaria longitarsis*, pl. 2, fig. 8, is defined :—

"*L. flavescens; pedibus posterioribus longis pilis vestitis; pedibus anterioribus ciliatis.*"

In the "Hiperineas," *Hyperia*, Latr., with *Lanceola*, Say, and *Hiella*, Straus, for synonyms, is thus defined :—

"*Corpus gibbosum, latum, anterius obtusum, posterius fortiter angustatum. Caput crassissimum, inflatum, verticale. Oculi magni, compositi. Antennæ minimæ in fossula capitis insertæ. Mandibulæ robustæ, palpigeræ, duabus cristatis masticatoribus terminatæ. Thorax septem annulatus. Pedes mediocres, angustati, ungue acuto terminati. Abdomen tribus primis segmentis magnis, appendicibus natatoriis elongatis munitis. Segmento quarto fortiter curvato, duobus ultimis caudiformibus.*"

The species "*Hyperia Gaudichaudii*," M.-Edw., is described. He also describes Guérin's genus *Primno*, with its type species, "*Primno macropo*" [macropa], and Guérin's *Pronoë*, likewise with its type species, *Pronoë capito*.

Oxycephalus, M.-Edw., he thus defines :—

"*Caput maximum, depressum, elongatissimum, anterius acutum. Antennæ superiores crassæ, fractæ, capite multo breviores, infra rostro insertæ: antennæ inferiores graciles, cylindraceæ, setaceæ, thorace longiores. Oculi maximi. Pedes primi et secundi parum dydactiles: segmentis* [sequentes] *elongatissimi, graciles, subulati. Pedes septimi paris vel brevissimi, vel nulli. Segmenta primo secundo tertioque abdominis magna, pedunculo appendicum natatoriarum crassissimo: segmenta quarto et quinto brevissima: sextum elongatissimum, appendice styliformi, acutissima, elongatissima, terminatum.*" A misprint here and there seems to have affected the Latinity of this passage. One species of this genus, the author says, pertains to Chili, namely, *Oxycephalus oceanicus*, Guérin, thus defined :—"*O. antennis superioribus ovatis, articulo parvulo, acuto, terminatis: antennis inferioribus parvis, quinque articulato: articulis æqualibus.*"

In Order IV, "Lœmodipodos," the "Caprelianas" contain the genus *Caprella*, which Nicolet assigns to Leach. He concludes the description of this genus with the words, "abdomen rudimentario, teniendo cerca de su base un par de apendicitos estiliformes y biarticulados," adding a note, "Conocemos tres especies de este género, é ignoramos por qué motivo el Sr. Milne-Edwards niega á las patas del segundo par las vijiguillas branquiales, puesto que la *C. longicollis* las tiene, y muy aparentes."

Caprella longicollis, n. s., pl. 4. fig. 3, is thus defined and described :—"*C. fusca; capite elongato, antice globoso, postice cylindrico; antennis superioribus setiformibus, longissimis; antennis inferioribus brevibus: pedibus paris secundi tarso angusto, elongato, antice dilatato, postice subcylindrico.*"

"Cabeza una vez y media mas larga que el primer articulo del tórax, con su parte anterior globosa y in espinas, ocupado el tercio de su longitud; los otros dos tercios son cilíndricos, mucho mas pequeños y tan gruesos como la mitad anterior del primer segmento torácico; antenas superiores muy lagas, fuertes en la base y disminuyendo insensiblemente de grosor hasta la estremidad del tallo multiarticulado; las inferiores son muy cortas, delgadas y filiformes; las patas del primer par están adheridas á la faz inferior de la parte globosa de la cabeza, cerca de la boca, son cortas, delgadas, y concluyen en una mano subglobosa; las del segundo par, al contrario, son muy largas y las termina una mano que ocupa la mitad de su total longitud, estrecha, levemente arqueada, repentinamente dilatada en el tercio anterior y subcilindrica cerca de su base; el segmento torácico á que estas patas se hallan adheridas es

irregularmente trianguliforme, y su ángulo anterior, que es el mas largo, sostiene le cabeza: en el posterior está inserto el segmento siguiente; las patas ocupan el ángulo inferior, que tiene además dos vejiguillas branquiales adaptadas á la base de las patas; los dos segmentos que siguen son, como el resto del cuerpo, subcilindricos, llevando cada uno dos vejiguillas branquiales; las patas del primero de los tres ultimos pares son muy cortas y rudimentarias, y las de los otros dos prolongadas y subquiliformes, con el penúltimo articulo dentellado en el lado interno; dos filetes espiniformes por bajo del abdómen.—Color moreno amarillento claro.—Longitud, 8 lin."

Caprella brevicollis, n. s., pl. 4. fig. 4, is defined:—

"*C. fusca; capite breri, subgloboso; antennis medioeribus; pedibus secundi paris antice oratis, subglobosis.*" It was taken with the preceding form.

Caprella spinifrons, n. s., is thus defined:—

"*C. capite breri, antice subgloboso; fronte spinoso; antennis superioribus longis pilis ciliatis; manibus secundi paris magnis, elongatis, intus fortiter emarginatis.*" This species was founded on a damaged specimen.

In the "Ciamianos," the genus *Cyamus* is described. The name of Lamarck is attached to it, as though he were the originator of the name. The species *Cyamus gracilis*, Roussel de Vauzème, figured on pl. 4. fig. 7, is defined with the words:—"*C. cinereo-virescens; corpore elongato, subfusiformi; appendicibus branquialibus elongatis, cylindraceis, simplicibus, ad basim bituberculatis.*"

The Atlas containing the figures referred to in these descriptions is dated 1854.

The new species, *Talitrus chilensis*, *Orchestia brevicornis*, *Orchestia gayi*, *Amphitoe gayi*, *Gammarus chilensis*, *Caprella brevicollis*, and *Caprella spinifrons*, are not included in the list of the Brit. Mus. Catal., 1862. *Caprella longicollis* is figured and described in that work, but as Mayer has pointed out, the species is by an error assigned to Lucas, and its habitat given as Algeria instead of Chili.

For the genus *Nicea* see Note on Rathke, 1837. The genus *Lalaria* is a synonym of *Aora*, Kroyer, 1845, and the species *Lalaria longitarsis* is identified by Spence Bate with Kroyer's *Aora typica*. *Caprella brevicollis* is considered by Mayer to include the female and young forms of *Caprella longicollis*, and, as *Caprellina longicollis*, the species becomes the type of a new genus founded by G. M. Thomson in 1879. This genus I propose to name *Caprellinopsis*, since *Caprellina* is preoccupied as the name of the group to which the genus belongs. *Caprella spinifrons* is left indeterminate by Mayer.

1849–1851. SCHIØDTE, J. G.

Bidrag til den underjordiske Fauna. Det kongelige danske Videnskabernes Selskabs Skrifter. Femte Række. Naturvidenskabelig og mathematisk Afdeling. Andet Bind. Kjobenhavn, 1851. pp. 1–39. Tab. i.–iv.

Specimen faunæ subterraneæ, 1849. m. 4 Tafeln. Aus den Abhandl. der Copenhagener Akademie der Wissenschaften. 5te Reihe. Bd. II. (Appears to be the same work as the above. See also Entom. Soc. Trans. I. 1850–51, pp. 134–157.)

Schiødte comments first on the slow growth of knowledge in regard to the subterranean fauna. In his historical review he mentions Tellkampf's *Triura cavernicola*, which, he says, "seems to belong to the order of Amphipoda," an obvious error in which he is followed by Boeck. At page 26, he institutes the new genus *Niphargus*, with this definition:—

"Ordo *Amphipoda*.—Familia *Gammari*.

"Oculi nulli. Antennæ superiores inferioribus longiores, flagello appendiculari minuto, biarticulato. Pedes ultimi paris stylo interiori brevissimo, exteriori valde elongato, biarticulato. Νίφαργος."

The type species he names *Niphargus stygius*, which is figured on Pl. III. In the course of a full description, he thus distinguishes the sexes, "*lamina basalis ultimi pedum paris* duplo longior segmento. *Stylus* ejus *interior* in mare sextam decimam in femina vero septimam styli exterioris partem æquans longitudine, apice spinulis præditus duabus setaque pennata singula. *Stylus exterior* cylindricus; *articulus primus* laminam basalem in femina duplo, in mare autem triplo superans longitudine, fasciculis ornatus utrinque spinularum brevium, in mari obsoletioribus; fasciculis lateris exterioris e binis compositis spinulis setaque pennata singula; *articulus secundus* in femina dimidiam articuli primi partem complens fere longitudine, lateribus apiceque fasciculis præditis setularum; in mare longitudine fere articuli primi, glaber, lævissimus, apice solo fasciculato."

He concludes with the statements:—"Commoratur in locis depressioribus specus Adelsbergensis et Lueg, aqua repletis stillicidio abundante sedimentoque tectis fundi chrystallino. Agillime salit, captu difficilis; territus latebras fundi velocissime petit."

Schiodte next describes with great fulness, and figures, Koch's *Pherusa alba*. As *Pherusa* was more than once preoccupied, he gives a new generic name, *Titanethes*, in "Ordo *Isopoda*.—*Familia Oniscl*.—Tribus *Oniscini*," the species becoming *Titanethes albus*. It is perhaps owing to Koch's use of the name *Pherusa*, earlier employed among Amphipods, that Schiødte's *Titanethes* has itself been spoken of as an Amphipod genus.

1850. Bate, Charles Spence, born March 16, 1819 (C. S. B.).

Notes on the boring of Marine Animals. In Notices and Abstracts of Communications to the British Association for the Advancement of Science, at the Birmingham Meeting, September 1849. pp. 73–75. London, 1850.

This paper, though mentioned in Boeck's list, does not refer to Amphipoda. Of Crustacea only *Pagurus* is mentioned.

The "Notes on Crustacea, Ann. Nat. Hist. VI. 1850, pp. 109–111. VII. 1851, pp. 297–300," also mentioned in Boeck's list, have no reference to Amphipoda.

Another paper by Spence Bate, in which no Amphipoda are mentioned, is likewise included in Boeck's list, "On some Crustacea dredged by Mr. Barlee in Shetland, Ann. Nat. Hist. X. 1852. pp. 356–357."

1850. Dana, James D.

Zoology. *A new genus of Orchestidæ*. The American Journal of Science and Arts. Second Series. Vol. IX.—May, 1850. New Haven. Number XXVI. p. 295.

Dana here says:—"In a synopsis of the genera of Gammaracea, in this Journal, volume viii. p. 135, three genera of Orchestidæ are mentioned, Talitrus, Orchestia and Allorchestes. We here add a fourth; and for the purpose of giving a fuller comparative view of the four, and correcting a misprinted word, we insert the generic characters for the group.

"Pedes primi non cheliformes nec subcheliformes, articulo styliformi confecti; secundi sæpe subcheliformes, manu sive parvulâ et debili sive nullâ. Antennæ superiores basi inferiorum breviores. . . *Talitrus* (Latreille).

"2. *Talitro* pedes primos antennasque similis. Pedes *maris* secundi valde subcheliformes, manu grandi. . . . . *Talitronus* (Dana).

"3. Pedes primi secundique plus minusve subcheliformes. Antennæ superiores basi inferiorum breviores. Maxillipedes apicem obtusi. . *Orchestia* (Leach).

"4. Pedes primi secundique plus minusve subcheliformes. Antennæ superiores breviores, basi inferiorum longiores. Maxillipedes apicem unguiculati. . . . . *Allorchestes* (Dana)."

1850. De Haan, Willem, born February 7, 1801, died April 15, 1855 (Hagen).

Fauna Japonica, auctore Ph. Fr. de Siebold. Crustacea elaborante W. de Haan. C. tab. Lith. LXV. Lugd-Bat. 1850.

During the publication of this fine work M. de Haan was stricken down with a grievous illness which confined him to his bed for years, but did not prevent his courageously completing the publication (Herklotz).

The only Amphipod dealt with is "*Caprella Krögeri*," of which the author only had a dried specimen to describe, hence, Mayer says, in spite of the good figure, it cannot be determined with certainty, though he believes it to be synonymous with *Caprella æquilibra*, Say.

1850. Hosius, A.

Ueber die Gammarus-Arten der Gegend von Bonn. Von Dr. A Hosius. (Hiezu Taf. III. und IV.). Archiv für Naturgeschichte. Sechszehnter Jahrgang. Erster Band. Berlin, 1850. pp. 233–248.

He complains that Gervais and Milne-Edwards, in attempting to distinguish *Gammarus fluviatilis* vel *röselii* from *Gammarus pulex*, disagree with one another, though both dealing with specimens from the neighbourhood of Paris. He assigns *Gammarus pulex* to Degeer and *Gammarus fluviatilis* to Rösel, but as he has never met with this latter species in rivers, he thinks that the name *Gammarus röselii* given it by Gervais ought to stand. He enters into a detailed comparison between these two species and the blind *Gammarus puteanus* of Koch. In regard to habitat, Hosius says that *Gammarus puteanus* is confined to wells, that he has only found *Gammarus röselii* in still or weakly flowing deep waters, but *Gammarus pulex* in strongly flowing, shallow, brooks, often only an inch deep. In Milne-Edwards' Manual, he says, we must cross out *Gammarus pulex*, put *Gammarus pulex*, Degeer, in place of *Gammarus fluviatilis*, and lastly insert *Gammarus röselii*, Gervais (or *Gammarus fluviatilis*, Rösel), and *Gammarus puteanus*, Koch.

1850. Liljeborg, V.

Bidrag till den högnordiska hafsfaunan. Öfversigt af Kongl. Vetenskaps-Akademiens Förhandlingar. Årg. 7. 1850. No. 3. (Sjunde Årgången. 1850. Stockholm, 1851). pp. 82–88.

In a letter to Ilr Lovén, Liljeborg mentions that in Russian Lappland he had observed among other Crustacea, *Gammarus locusta*, Mont., Kröy.; "*Anonyx Edwardsii*, Kröy."; *Caprella*

lobata (Muell.), Kröy. In the neighbourhood of Tromsö, he mentions "Gammarus locusta Mont., Kröy. Varietas: Antennæ superiores inferioribus longiores, et earum pedunculi articulum penultimum ped. antenn. infer. excedentes. Pardalisca cuspidata Kröy.—*Leucothoë norvegica* n. sp. L. clypeatæ Kröy. sat affinis. Antennæ superiores inferioribus longiores, flagello pedunculo longiore, articulo primo secundum superante, et art. tertio minimo; flagellum antenn. infer. ultimo pedunculi articulo *brevius vel æquale;* manus pedum secundi paris maxima, dilatata, *apice vero acuminato*, aculeoque marginis posterioris terminali *validissimo et ungui æquali;* epimera quarti annuli thoracici maxima, *latitudine vero altitudine parum majore*.—Anonyx ampulla (Phipps). Kröy.—Caprella lobata (Muell.). Kröy." Both by Spence Bate and Boeck *Leucothoë norvegica* is considered as probably identical with *Leucothoë clypeata*, Kroyer, 1842, becoming in that case *Metopa clypeata*. Bate and Westwood in their Appendix, vol. ii. p. 500, retain it as a distinct species, *Montagua norvegica*. Kroyer's *Leucothoe clypeata* they think may be the female of *Montagua polleriana*, Spence Bate. Any one who has seen the figure of the hand of the second gnathopod of *Leucothoë norvegica* given by Liljeborg in the K. V. A. Handl., 1851, will be convinced that he has anticipated Bate's *Montagua polleriana*, with which also his description minutely agrees. If this be a variety only of *Metopa clypeata*, as Boeck supposes, it is at any rate a very striking one. For the present it may stand as *Metopa norvegica*, Liljeborg, with *Leucothoë norvegica*, Liljeborg, *Montagua polleriana*, Sp. Bate, and *Montagua norvegica*, Sp. Bate, and Bate and Westwood, for its synonyms.

1850. Natale, Giuseppe de.

Descrizione zoologica d'una nuova specie di plojaria e di alcuni crostacei del porto di Messina con poche considerazioni generali sulla natura delle appendici aculeiformi delle piante e degli animali. Messina, 1850.

After describing the insect, Tav. I. fig. 1, which he names "Plojaria *Ambigua*," n. s., at page 8 de Natale begins the following account of *Cheiropristis messanensis*:—"Il genere Cheiropristis (Tav. I. fig. 2.) formato dal Prof. Cocco, sopra certi Crostacei del nostro porto, ei son parecchi anni, merita di essere illustrato come singolarissimo per le forme esterne.

"La famiglia degl' Iperidi, tra i Crostacei Amphipodi, distinta da molti e razionali caratteri da quella dei Gammaridi; come si sa, può dividersi in tre sottofamiglie. La prima, che si potrà dir degli Iperidi Gammaroidi, distinguesi bene dalle due altre; perchè sempre presenta nei suoi generi un piccol capo, un corpo compresso, con gambi palpiformi rudimentali ai piedi maxcellari. Anzi, indipendentemente dagli altri caratteri, si potrebbe, come principale, assegnar la picciolezza relativa del capo per distinguerla dalle due sottofamiglie seguenti le quali, tranne il solo Oxycephalus, ei presentano un capo grosso ed enormo. Ma di queste due la prima, che si disse dall' Edwards *Iperini Normali*, presenta le antenne del secondo pajo stiliformi, non ripiegabili su di sè; ed in ciò distinta dalla terza sottofamiglia detta degl' *Iperini Anormali*, le cui antenne ripiegabili su di sè costituir potranno di tre a quattro fratture.

"In quest' ultima sottofamiglia, che potrebbe dirsi dei Tifini, perchè il genere Typhis ne è il tipo, vanno finor classati tre generi; cioè: Pronoë, Typhis ed Oxycephalus. Distinti i due primi dal terzo ad un capo corto, arrotondato, e portante le antenne del primo pajo alla sua faccia anteriore, mentre il terzo ha un capo lunghissimo, e puntuto colle antenne del primo pajo inserite sulla sua faccia inferiore. Distinto il Typhis dalla Pronoë, poichè questa non presenta, come il primo, i piedi del secondo pajo prensili, ed il primo articolo dei piedi delle due ultime paja clipeiforme grandissimo. Dalla Typhis, non si conosce nostrale che l'unica

T. *Oroides* che, come vedremo in appresso contrariamente al parere di M. Edwards, differisce assaissimo dall' Orio *Zaneleus* del Prof. Cocco. La Pronoë, e l'Oxycephalus sono esotici a noi.

"Fra questi tre generi, che sinora comprendono la sottofamiglia degli Anfipodi, Iperidi, Tifini, deve oramai intercalarsene un quarto, scoperto da parecchi anni dal Prof. Cocco, e da lui chiamato Cheiropristis. Di esso daremo la descrizione ed il disegno sopra individui soggetti ad osservazione microscopica.

"Tra i tre generi Iperini menzionati, più al Typhis rassomiglia il Cheiropristis. Com' esso, infatti, ha un capo corto e grosso, le antenne ripiegabili in fratture e le anche dilatate. Ma se ne distingue per importanti caratteri.

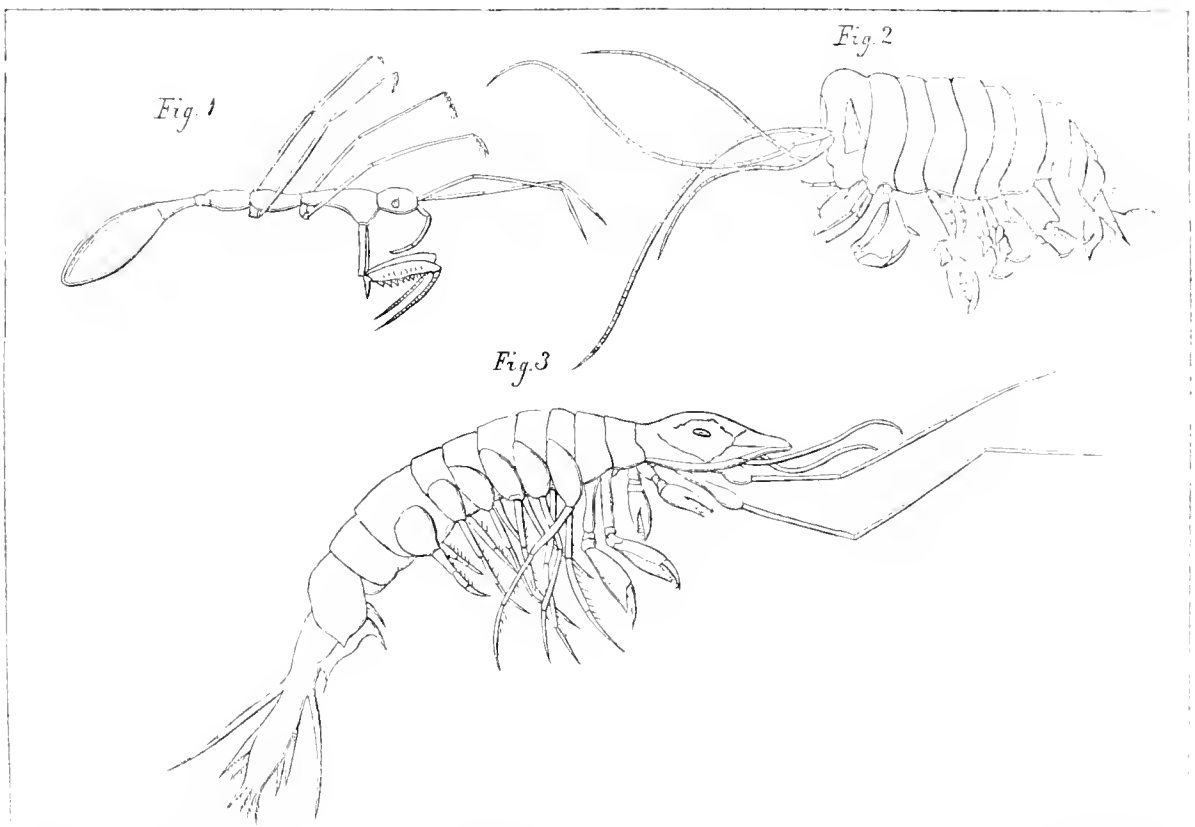


Fig. 25.

"I Typhis distinguonsi eminentemente per una specialità di struttura delle anche delle due ultime paja, che larghissime sono, e clipeiformi in modo che formano come due valve, le quali, riunite ed approssimate in mezzo, l'animale ripiegando i piedi, e la coda al di sotto, chiudono inferiormente il corpo, e gli danno la forma d'uno sferoide. La estremità posteriore della coda è senza appendici.

"Il Cheiropristis però non presenta per nulla questa straordinaria dilatazione delle anche delle due ultime paja di piedi, le quali se non dilatate, sono incapaci ad occultare il corpo come fra due valve; la sua coda ha delle appendici; ma come il Typhis presenta i piedi del secondo pajo prensili, ma un pochino diversamente conformati.

"Esso ha un capo corto, ma largo, verticale, ribattuto sul corpo, più largo arrotondato in sopra,

più stretto, con alcune smarginature sulla faccia inferiore. Le antenne, situate sul mezzo della sua faccia anteriore, sono inserite sopra due peduncoli cortissimi che si toccano alla base. Da ciascun peduncolo corrono infuori due altri articoli, di cui il secondo più lungo, e come che si biforcasse, caccia le due antenne, composte di un gran numero di articoli ripiegabili con fratture o no. Le inferiori sono sempre più corte delle superiori. Gli occhi son posti obliquamente ai lati del capo; son triangolari, coll' apice del triangolo in alto, e coll' angolo esterno della base che tocca il margine esterno del capo. Sotto il margine inferiore del capo, e cominciando d'avanti in dietro, stanno due palpi mascellari gracilissimi, corti, filiformi, sporgenti in avanti, con tre articoli distinti. Dietro questi si osservano due steli palpiformi, cortissimi, ad un' articolo poco distinto, e dietro di questi i piedi mascellari lunghetti, filiformi, di tre articoli di cui l'ultimo, appena visibile, curvato a gancetto sul penultimo. Esistono sette paja di piedi diversi tutti di forma, come sette sono gli anelli toracici che li portano.—Il primo e secondo articolo del primo pajo son cortissimi e gracili, ma il terzo è lungo, dilatato, arcuato, e porta dietro due o tre pezzi corti interarticolari, l'ultimo articolo terminato da due robusti denti uno in avanti, e più lungo del precedente. I piedi poi del secondo pajo son di diversissima conformazione. Il lor primo articolo è largo, lungo, ad orli angolosi, laminare; al suo orlo articolare inferiore presenta una forte smarginatura in cui si annida un articolo stretto e gracile; questo porta un terzo articolo lungo quasi quanto il primo, ma dentato a sega sul suo orlo posteriore; un quarto articolo si attacca a quest' ultimo, mobilissimo, e si può piegare sul taglio di esso posteriore in modo da dar a questo articolo terminale l'apparenza d'una mano subcheliforme.

" Il terzo pajo di piedi contrasta col precedente per la sua esiguità. É gracile, cortissimo, filiforme, con tre articoli appena distinti di cui l'ultimo a punta si finisce. Il quarto pajo ci presenta uno sviluppo molto cospicuo, come i due seguenti; in esso infatti, il primo articolo è allungato sebbene un po' stretto; porta in giù di esso altri due articoli, di cui l'ultimo più grande dà inserzione al terminale che è edentulo, arcuato e piegato a gancetto su di quello. I primi articoli dei piedi del quinto e sesto pajo sono più larghi e forti, ma quel del sesto più di quel del quinto; ambedue dietro essersi articolati con parecchi anelli picciolini, esilissimi, terminansi con uno che è arcuato e piegato pure a gancetto sul penultimo. Il settimo pajo di piedi addimostrasi ad un solo articolo cortissimo, e visibile appena. L'addome in vero è pochissimo sviluppato, con due soli articoli di cui uno rudimentale, e se le molte analogie che legano il Cheiropristis ai Tifidi non si opponessero, noi, con ragioni evidenti, lo porremmo per quest' ultimo carattere tra i Ciamidi nei Lemodipodi. La coda terminasi per una natatoja mediana triangolare terminata a punta, frangiata di cigli lamellosi agli orli, e di due altre natatoje di forme subromboidale ai fianchi.

" Il corpo è tozzo; è largo e corto, altissimo il torace, onde la larghezza si comprende due volte e mezzo nella lunghezza totale. Alto uniformemente dal capo fino agli ultimi anelli toracici, esso si restringe notevolmente verso la coda, i cui anelli non han la metà dell' altezza del torace.

" Data così la descrizione generica del Cheiropristis, i caratteri suoi specifici potrebbero formolarsi così brevemente.

" Cheiropristis *Messanensis.* (Cocco) *Corpore antice tereti, superius roseo, albicante inferius, sesquilongiore quam alto. Antennis superioribus longissimis, inferioribus ultra earum dimidium porrectis; laminis caudæ lateralibus, subrhomboidalibus, media triangulari mucronata.*

" Anco ai Typhis si rassomiglia il Cheiropristis per l'abitudine che ha di contrarre i piedi sotto il torace, in modo che, in tutti gl' individui che se ne prendono non comparisce di essi che il solo torace al di fuori, e non è che con la più gran pazienza del mondo che si arriva a svolgere i lor piedi senza romperli. É lungo da tre a quattro linee. In certi giorni dell' andato Decembre il mare ne gittò infiniti lungo la spiaggia presso al nostro porto; ma, d'allora in poi sono scomparsi."

It will be seen in the note on Cocco, 1832, that in that year Cocco mentions a species which he calls *Chiropristis litorea*, but I can nowhere find allusion to any description of either the genus or the species, and am at length forced to conclude that Cocco never published any. In this case *Cheiropristis messanensis* should be cited with de Natale's name both for genus and species. It is not easy to see what de Natale means by saying that the posterior extremity of the tail is without appendages in *Typhis*, while he affirms that in *Cheiropristis* the tail has appendages. *Typhis* has in fact three pairs of uropods, whereas he represents his *Cheiropristis messanensis* with only one pair. His statement that the abdomen of *Cheiropristis* has only two joints, of which one is rudimentary, can scarcely be trusted, and indeed does not agree with the figure, in which at least two fully-developed pleon segments are shown and a third not obscurely indicated. In the B. M. Catal., p. 325, under *Anchylomera sedentaria*, the *Phronima sedentaria* of Costa, Spence Bate say, "I am inclined to think that *Cheiropristis Messanensis* of Cocco belongs to this genus and probably to this species." In agreement with this opinion I consider the species to be *Anchylomera messanensis*, de Natale, in the subfamily Phrosininæ. In comparing de Natale's description with others relating to species in the same genus, allowance must be made for the fact that he obviously took only a lateral view of his specimen, without dissection. In such a view, I know from experience that the broad fourth joint in the large third peræopods of *Anchylomera* may appear narrow, and that a telson in reality rounded may seem to be lanceolate. His attempt to disentangle the limbs without breaking them, may well excite the commiseration which he invites, since he had evidently not thought of the expedient of separating them from the body of the animal.

Of *Orio zancleus*, Cocco, de Natale says that Milne-Edwards judged inconsiderately in saying that it did not appear to differ from *Typhis*. Besides the characters here derived from a single damaged specimen in spirits, he gives a fuller account in the appendix.

He institutes a new genus to receive "*Ornithoramphus Coccoi*," figured Tav. 1. fig. 3. This, though he calls it a new Crustacean, had been long before described by Cocco as "*Orio Ornithoramphus*," with some doubt whether it should not be put in a separate genus. Of the necessity of this de Natale was convinced, but was somewhat doubtful whether it might not belong rather to the Isopoda than to the Amphipoda Hyperina. He describes it thus:—

"Esso si presenta d'una forma allungata e rotondetta. Il capo, convesso all'orlo superiore, finisce in avanti a modo di becco d'uccello; apparenza tanto più curiosa, in quanto che porta ai lati della sporgenza rostriforme, un solco che simula una specie di commissura. Gli occhi son piccolissimi, quasi invisibili, e segnati solo da due punti nerastri per ciascun lato del capo. I palpi mascellari gracilissimi ad articoli indistinti. I piedi mascellari con un'articolo basilare grosso e piriforme, che porta in fine tre filiformi articoli lunghissimi, fratti e piegati su di sè in un solco longitudinale inferiore del capo; una strozzatura separa il capo dal collo. Dal primo anello toracico, ed inferiormente, sembrano che prendessero inserzione i piedi mascellari, che son corti, tozzi, robusti, ineguali, ad articoli stretti e corti, di cui l'ultimo porta una vera mano cheliforme. Simile chela termina pure i piedi toracici del primo pajo, di cui il primo articolo è lungo, stretto, lineare; ma l'ultimo robusto, dilatato e terminato da mobile gancetto. Tutte le altre sei paja di piedi seguenti, in generale, tranne una varia lunghezza di esse, e degli articoli che le costituiscono, sono identiche. Il lor primo articolo è dilatato, foliaceo, diafano; i seguenti stretti, allungati simili a palpi, frangiati di peli agli orli. Il primo pajo tra esse è il più lungo, quindi vanno gradatamente decrescendo di lunghezza, fin l'ultimo che è cortissimo e con tre soli articoli lineari. I sette anelli toracici son quasi simili, della stessa altezza del capo. L'addome si compone di tre anelli ben conformati e distinti, ma l'ultimo porta inferiormente due lamelle vibratili, diafane, che si piegano l'una sull'altra come valve.—Queste lamelle

saran, come negl' Isopodi, una metamorfosi degli ultimi falsi piedi addominali? Questa domanda che sinor non abbiam potuto risolvere, a causa del piccol numero d'individui che si venner fra le mani, ci impedirà di determinare il posto che dovrà occupare l'Ornithoramphus nella serie Carcinologica.—Manca l'addome di qualunque traccia di falsi piedi; ma la coda però si termina per un potente ed allungato articolo, che porta ai fianchi due lamelle filiformi a mo' di stiletto, che son le lamine nuotatrici laterali. Più indietro, ed in sotto, stanno da ciascun lato due lamelle triangolari, mobili, divaricabili tra esse; finisce la coda in un pezzo quadrifido terminale. Avendone rinvenuto uno, ancor vivente, gettato sulla spiaggia, al veder le lamelle terminali dell'addome vibrar fortemente, mi corse in mente d'aver per le mani un'Isopoda. Questa idea mi venne confermata, qualor osservandolo al microscopio non mi fu dato osservar traccia alcuna delle vescicole branchiformi, respiratrici che caratterizzano eminentemente gli Amfipodi. Per altro, la total mancanza di falsi piedi addominali, lo allontana da tutti gl' Isopodi; e se le lamelle vibratili si volessero considerare come trasformazione di tali piedi, converrebbe costituire, tra gl' Isopodi, una famiglia a parte, in cui esso solo si comprendesse."

He finds it has great analogy with the Sphæromidæ, but other points tend towards placing it with the Typhidæ.

"I caratteri specifici potranno così brevemente formolarsi. Ornithoramphus *Cocconi. Corpore hyalino, pellucido; capite subrotundato, rostro brevissimo, teretiusculo, longitudine altitudinis quintuplum fere æquante; capite longiore altitudine corporis. Oculis minimis; laminis caudæ lateralibus, anterioribus styliformibus valde elongatis.*

Having obtained five fresh specimens, de Natale was able to add an "appendice all' Orio zancleus." In this he says, "Eccol descritto con le più rilevanti differenze, che dai Typhis, lo distinguono—

"Ha un corpo tozzo, breve, raccolto; un capo grosso, con un muso ottuso, e due enormi occhi triangolari, laterali, con l'apice in alto—Manca di qualunque traccia d'antenne superiori che nei Typhis costantemente esistono inserte a capo al muso—Egli è vero che potrebbe supporsi, essersi tali appendici perdute e rotte; come avvien di sovente nel descritto Cheiropristis, ed in altri moltissimi; ma poichè tra tutti gl'individui da me, e dal Prof. Cocco osservati, non ne è stato mai alcuno, che ne avesse offerto traccia; così ci é quasi certo di poter conchiudere che esse manchino affatto—Le antenne inferiori giacciono, come i palpi, bifratte, annidate, ripiegate in un ampio incavo sottocefalico—I piedi delle due prime paja toraciche terminansi a chela didattila, larga, dentata; ma gli articoli basilari del primo pajo son lineari, mentre quelli del secondo pajo sono stranamente contorti, e dilatati—Quelli delle due paja seguenti son gracili ambulatori terminati da valida ugnetta—Di simil guisa terminansi i piedi del 5° e 6° pajo; ma il lor articolo basilare è dilatato, foliaceo, applicato sui piedi anteriori nel riposo—Ma questa dilatazione è un rudimento in paragone a quella, che si vede nei Typhis, in cui può occultar sovr' essa la coda, e l'addome interamente. I piedi del 7° pajo sono rudimentali. Il torace alto quanto il capo non è rigonfio come nei *Typhis*: in questi, i tre primi anelli addominali son grandi, ma son picciolini nell'Orio. In quelli i falsi piedi han largo il peduncolo, le cui lamine terminali son allungate striate a traverso, dentellate agli orli—Nell'Orio ciascun peduncolo porta quattro laminette stiliformi, acute, non rigide, nè striate, nè dentellate. Il 4°, 5°, 6° anello addominale costituiscono nel *Typhis* una coda bruscamente ripiegata in giù, con tre altre paja di falsi piedi, e due lamelle terminali. Nell'Orio i sudetti anelli più bassi del tronco, non son piegati in giù, ma orizzontali, con nessuna traccia di falsi piedi, ma con sei paja d'appendici nuotatrici, laterali, oltre il pezzo stiliforme terminale—

"I caratteri specifici dell'Orio Zancleus saranno.

"Orio *Zancleus* (Cocco)—*Grysco-Lutescente, punctis nigricantibus adsperso; altitudine longitudinis quartum, et ultra æquante; oculis triangularibus nigris; laminis caudæ lateralibus lanceolatis.*—

"Negli Amfipodi Iperini Anormali si raccoglieranno adunque i generi Typhis, Orio, Pronoe, Cheiropristis, Oxycephalus, ed Ornitoramphus—La diversità generica tra questi due ultimi potrà dedursi da che l'Oxycephalus presenta: occhi enormi, due paja d'antenne, sei anelli con sei paja di falsi piedi addominali; l'Ornitoramphus mostra: occhi microscopici, antenne nulle, tre anelli addominali senza traccia di falsi piedi, ma con lamelle vibratili branchiformi, ond' é che meglio starebbe tra gl'Isopodi—I caratteri della famiglia, come furono stabiliti dall'Edwards per comprender la Pronoe, il Typhis, e l'Oxycephalus, son da modificarsi or che se ne trovano intercalati altri tre generi. Essi saranno: capo grosso, antenne or patenti, or occulte in una smarginatura sottocefalica, ma sempre ripiegabili in fratture—Cosi la famiglia de'Tifini, verrà distinta da quella degl'Iperini Gammaroidi o Vibilidi a capo costantemente picciolino—e dagl'Iperini Ordinari ad antenne superiori subuliformi, ed alle inferiori non ripiegabili in fratture."

It may be presumed that in the account of *Ornithoramphus Coccoi*, by the terms "i piedi mascellari con un'articolo basilare grosso e piriforme," and "i piede mascellari, che son corti" etc., de Natale intends respectively the second pair of antennæ and the first gnathopods. "I piedi mascellari," may be either the first antennæ or the mandibular-palps. The species should be compared with that called *Oxycephalus typhoides*, by Claus, in 1879. This species, from Zanzibar and from the harbour of Messina, has "Kopf kugelig aufgetrieben, mit sehr tiefer Antennengrube und spitzem, ziemlich kurzem Schnabel. Nackengegend stark verengert. Die vorderen Antennen des Männchens gross, mit stumpfen Zahnfortsatz an dem sehr gestreckten Schaft. Zweites Antennenpaar sehr lang, mit stark ausgebogenen Gliedern und kurzem Endgliede. Greifhand der vorderen Beinpaare mit ungezähntem, in eine lange Spitze ausgezogenem Rand." Other particulars are given, concluding with "Das Caudaldoppelsegment mehr als zweimal so lang wie die kurze Schwanzplatte. Letztes Uropodenpaar sehr kurz." It is clear from de Natale's figure that he has fallen into a misapprehension in regard to the "microscopically small" eyes, as he indicates their very considerable extent.

In the account of *Orio zanclæus*, de Natale denies the presence of upper antennæ, but fig. 3 on plate ii., here reproduced in fig. 26, evidently represents this species, though the fact is not stated in the text, and in this figure *three* antennæ appear.

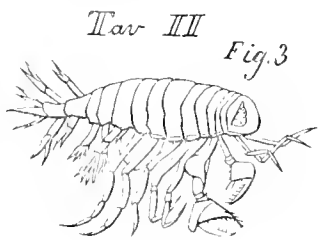


Fig. 26.

Claus gives the following account of *Euprono*ë *maculata*, n. s., from Zanzibar:—"Körper gestreckt, 10–12 mm. lang, mit grossen ramificirten Pigmentflecken. Kopf ziemlich lang und vorn merklich verschmälert. Der proximale eingekrümmte Abschnitt am Femoralgliede des vorderen Beinpaares so lang als der nachfolgende verbreiterte Theil. Scheerenfortsatz am Carpus des zweiten Beinpaares so lang als das Metacarpalglied. Distaler Theil des Femoralgliedes keulenförmig angeschwollen. Carpalglied des sechsten Beinpaares ohne Fortsatz. Femoralplatte des siebenten Beinpaares viel kürzer als die des vorausgehenden Beinpaares. Schwanzplatte trigonal am hinteren Ende verjüngt, lanzet-förmig zugespitzt." In *Euprono*ë *armata*, n. s. (*Prono*ë *brunnea*, Dane?), he gives, "Korper mässig gestreckt, punktirt, circa 7–8 mm. lang, mit grossem, gerundetem Kopf." A female *Euprono*ë, 4 mm. long, from Lagos, which is, he says, extremely near the preceding species, "entbehrt der kreisförmigen Einkrümmung an den vorderen Gnathopoden." From these accounts it seems possible that Cocco's *Orio* may have anticipated Claus's *Euprono*ë, but there are many difficulties in the comparison.

1850. Natale, Giuseppe de.

Su pochi Crostacei del porto di Messina. Lettera del Dottor Giuseppe de Natale al Sig. Achille Costa. Con una tavola. Napoli, 1850.

This paper is mentioned in Boeck's list. I was unable to obtain a sight of it until too late for an abstract to be inserted here. See appendix to the Bibliography.

1850. Steenstrup, Johannes Japetus Smith, born March 8, 1813 (J. J. S. S.).

Foreløbig Bemærkning om Forekomsten af en *Otion* og en *Cyamus* paa den færoske Grindehval (*Delphinus globiceps* auct.). Videnskabelige Meddelelser fra den naturhistoriske Forening i Kjøbenhavn for Aarene 1849 og 1850, p. 95–96.

The *Cyamus* sp. n.? of this paper was afterwards described by Lütken under the name *Cyamus globicipitis*. Lütken, 1873, page 48 (276), assigns Steenstrup's paper to the Forening for 1843; Boeck gives it as above.

1850. White, Adam.

List of the specimens of British Animals in the Collection of the British Museum. Part IV. Crustacea. Printed by order of the Trustees. London, 1850.

The Introduction assigns this Catalogue to Mr. Adam White. The title shows the limitation of its scope compared with the "List of the specimens of Crustacea," drawn up by the same author in 1847. The nomenclature is somewhat varied, and numerous synonyms are here given for the terms adopted. The class Crustacea is adopted from Brisson, 1756; Subdivision 1. Crust. Maxillosa, from Latreille, 1825; Legion II. Edriophthalma, from Leach, 1814–1815; Order III. Amphipoda, from Latreille. In this is placed *Tribe* 1. Gammarita, containing Fam. I. Orchestidæ; Fam. II. Gammaridæ; Fam. III. Podoceridæ; Fam. IV. Cheluridæ; and *Tribe* 4 [2]. Hyperita, containing Fam. I. Phronimadæ; Fam. II. Typhidæ. Order IV. *Læmodipoda*, Latreille, contains Fam. I. Caprellidæ.; Fam. II. Cyamidæ.

Naturally, many species in the former List do not occur in this which is confined to British Animals. Among the Gammaridæ the additions are, *Opis typica*, Kroyer's Sea-Screw, from Ireland; *Anonyx albus*, British Coast; *Anonyx*, sp., Thompson, from Ireland; *Amphithoe punctata*, Johnston's Coast-Screw, referred to "Gammarus punctatus, *Johnston, Zool. Journ.* iii. p. 177; *Thomp.* (W.) *Ann. Nat. Hist.* xx. p. 243," but without any explanation of its relations to *Amphithoe punctata*, Say, mentioned in the earlier list. This is followed by *Amphithoe dubia*, referred to "Gammarus dubius, *Johnston, Zool. Journ.* iii. p. 178." In place of "Vertumnus Cranchii" of the earlier list, the following entry is made:—

"Acanthonotus.

"Acanthonotus, *Owen, Ross's Second Voyage, Appendix*, p. xc. (1835).

"Oniscus, pt. *O. Fabr. Faun. Groenl.*

"Amphithoë, pt. *Kroyer.*

"Vertumnus, *Leach, MSS.*; *White* (1847).

"1. Acanthonotus (Vertumnus) Testudo. Cranch's Sea-Screw.

"Jun. Oniscus Testudo, *Mont. Linn. Trans.* ix. p. 102. t. 5, f. 5 (fig. pessima); *Leach, Ed. Enc.* vii. p. 405.

"Vertumnus Cranchii, *Leach, MSS.; White, List of Crust. in Brit. Mus.* p. 89 (1847).

"Acanthonotus (Vertumnus) Testudo, *White, Proc. Zool. Soc. Lond.* 1850, t. f."

To the genus *Gammarus*, White now adds, *Gammarus subterraneus*, Leach, which he suspects may be "Gammarus pulex, var. jun.?"; *Gammarus carinatus*, the Keeled Coast-Screw, "*Johnston, Zool. Journ.* iv. p. 52;" *Gammarus maculatus*, the Spotted Coast-Screw, *Johnston, Zool. Journ.* iii. p. 176; while *Gammarus campylops*, Leach, is now given as *Gammarus camptolops*, the Bent-eyed Coast-Screw. In the Podoceridæ, "Jassa, *Leach, Ed. Enc.* vii. p. 433 (1814 or 1815)," receives the two species in the earlier list assigned to *Cerapus*. To the well-known *Corophium*, is applied the English title of "Long-horned Mud-Liver." The Family Cheluridæ is occupied by *Chelura terebrans*, "Sea Wood-borer," Philippi's names for the genus and species being rightly preferred to the older MSS. names, *Nemertes nesæoides*, Leach.

To the family Typhidæ is added *Typhis nolens*, for "Gammarus nolens, *Johnston, Zool. Journ.* iii. p. 179."

Among the Caprellidæ, Leach's *Caprella acanthifera*, Spined Skeleton-Screw, displaces the name *Caprella acuminifera*, Leach, and the additional entry is made of "Caprella lobata, *Müller, Kroyer, Voy. Scand. et Lapon. Crust.* pl. 25, f. 3, *a.; Thomp.* (W.) *Ann. Nat. Hist.* xx. p. 244." Lastly *Proto pedatum* becomes *Proto pedata*, Müller's Spectre Shrimp.

In the family Cyamidæ, the species are given as "1. *Cyamus ceti.* Common Whale-louse," including in the synonymy *Cyamus erraticus*, Roussel de Vauzème, with *Oniscus ceti*, Linn., etc., etc.; "2. *Cyamus ovalis.* Oval whale-louse," and "3. *Cyamus gracilis*, Slender Whale-louse." A concluding observation says, "Here by many authors are placed Nymphon, Pycnogonum, and their allies."

Most of the species are designated by English names similar in character to those which have been quoted.

1850. WHITE, ADAM.

Descriptions of two species of Crustacea in the British Museum. Proceedings of the Zoological Society of London. Part XVIII. 1850. London. pp. 95–97.

After describing *Potamobius serratus* and *Gonodactylus cultrifer*, n. s., which are figured on Pls. XV. and XVI., White says, "On the same plate with *G. cultrifer* is figured an Amphipod, which *may be* the species figured by Colonel Montagu in the ninth Volume of the 'Linnean Transactions,' t. 5. f. 5, under the name of *Oniscus Testudo*. I have named this on the plate *Acanthonotus Testudo*: it belongs to Prof. Owen's genus *Acanthonotus*: in the British Museum it bears Dr. Leach's manuscript name, *Vertumnus Cranchii*. The head is produced and pointed between the antennæ, and instead of the small number of segments assigned by Colonel Montagu to his *Oniscus*, there is the normal number of the various genera of Amphipoda."

It was afterwards recognised that this species has nothing to do with Montagu's *Oniscus testudo*, and that it does not belong to Owen's genus *Acanthonotus*, but to the neighbouring genus, *Epimeria*, of Costa, being in fact *Epimeria cornigera*, Fabr.

1851. BATE, C. SPENCE.

On a new genus and several new species of British Crustacea. The Annals and Magazine of Natural History. Ser. 2. Vol. 7. 1851. pp. 318–320. Pl. XI. figs. 1–8. Pl. X. fig. 10.

The species *Bellia arenaria* here figured and described was subsequently named *Sulcator arenarius*, but in the meantime Dana had recognised it as belonging to Say's genus

Lepidactylis, and S. I. Smith has identified it with *Lepidactylis dytiscus*, Say, which is the same as *Oniscus arenarius* of Slabber, for which P. L. S. Müller proposed the generic name *Haustorius*. The genus *Bellia* is thus defined :—"*Back* broad, round and smooth. *Upper antennæ* forked. Lower antennæ ciliated, having the second joint flattened. *First pair* of feet simple: *second and third pairs* didactyle, remainder simple. The *three anterior pairs* of feet much smaller than the rest; the *lateral appendage* to each annular segment, together with the joints of the three last pairs of feet, largely developed, so as to appear like scales. *Natatory feet* arranged in double parallel pairs." I may mention that this creature is very common in stretches of sand round the British coasts, and very vivacious in appearance when burrowing into the sand. While it is alive in sea-water, the circulation can, under the microscope, be very distinctly seen in the broad plates of the hinder pereopods.

"*Amphithoë Moggridgei*" here described and figured as new, was in the Brit. Mus. Catal., 1862, referred to *Amathia* (*Cancer*) *carino-spinosa*, Turton, but in the same year, 1862, in the "British sessile-eyed Crustacea," it was identified with *Amathilla sabini*, Leach, the *Amathilla homari*, Fab., of this Report.

1851. Brandt, J. F.

Beiträge zur Kenntniss der Amphipoden (*Crustacea Amphipoda*) von J. F. Brandt. (Lu le 15 novembre 1850.) pages 133–144, and (Lu le 20 decembre 1850). pages 310–313. Bulletin de la classe physico-mathématique de l'Académie impériale des sciences de Saint-Pétersbourg. Tome neuvième. St-Pétersbourg, 1851. Pl. IX.

After reviewing earlier opinions on the distinctions between *Talitrus* and *Orchestia*, and the agreement of the two in regard to the second gnathopods of the females, he points out that in many other classes generic distinctions have been drawn from the peculiarities of a single sex, but that, apart from this, there is a real though somewhat fine distinction between *Talitrus* and *Orchestia* in regard to the first gnathopods. He therefore defines these as follows, recognising that "Der zweifelhafte, vielleicht keinen echten *Talitrus* darstellende *T. Cloquetii* ist dabei ausgeschlossen" :—"Genus Talitrus Bosc. e. p. *Talitrus Leach, Latr. M. Edw. Dana.* Pedum primi paris ultimus articulus in mare et femina subconicus, haud cheliformis vel subcheliformis, ungue elongato, parum flexili ipsius articuli marginem inferiorem longe superante armatus.—Pedum secundi paris ultimus articulus in utroque sexu ungue obsoleto, margine ipsius inferiore breviore instructus.—Antennæ superiores basi seu pedunculo inferiorum breviores. Maxillipedes apice obtusi.

"Genus Orchestia Leach. *Latr. M. Edw.* Pedum primi paris ultimus articulus in maribus et feminis plus minusve apice dilatatus, ungue flexili, incurvo breviusculo armatus, quare subcheliformis.—Pedum secundi paris ultimus articulus marium semper maximus, cheliformis, in feminis mediocris vel parvus complanatus ungue obsoleto ipsius margine inferiore breviore instructus. Maxillipedes apice obtusi."

Talitrus cloquetii, if rightly represented in the *Description de l'Egypte* should, he thinks, form an intermediate genus (eine eigene Mittelgattung) between *Talitrus* and *Orchestia*, for which he proposes the name, *Talitrorchestia?* He would then follow Guérin in making three sections of the genus *Talitrus*, thus arranged :—

"*Sectio A. Pedum par anterius secundo longius*," with "Spec. 1. Talitrus saltator Montagu;" "Spec. 2. Talitrus Beaucoudraii M. Edw;" "Spec. 3. Talitrus brevicornis M. Edw.;" "Spec. 4. Talitrus tripudians Kröyer."

"*Sectio B. Pedum primum et secundum par longitudine æqualia*," with "Spec. 5. Talitrus platycheles Guerin.'

"*Sectio C. Pedes primi paris secundi paris pedibus breviores. (Subg. Talitrorchestia nob.)*," with "Spec. 6. Talitrus Cloquetii (Audouin) Savigny."

In further remarks on this last species, of the correct figuring of which he is with some reason rather suspicious, he considers that his proposed new genus or subgenus agrees with *Orchestia fem.* by the structure of the first gnathopods, but by the relations of the second gnathopods not entirely either with *Orchestia* or with *Talitrus*, except that in "T. Cloquetii" the first gnathopod appears shorter than the second (as in *Orchestia mas.*); a circumstance, he says, which led Guérin to make it the type of his Section C.

The genus *Orchestia* is arranged by Brandt as follows:—

"*Sectio I. Antennæ superiores pedunculo inferiorum breviores. Subgen. Orchestia nob.*)

"*A.* Pedum sextum et septimum par longitudine fere æquales vel septimum paullo longius.

"*a*) Marium septimi pedum paris tertius et quartus articulus plus minusve dilatati et incrassati *Gen. Orchestia Leach Mss.?*

"*α*) Fortiter dilatati." "Spec. 1. Orchestia littorea M. Edw."; "Spec. 2. Orchestia Montagui Audouin," expressly including "O. littorea Rathke."

"*β*) Satis dilatati." "Spec. 3. Orchestia Euchore F. Müller;" "Spec. 4. Orchestia platensis Kröyer."

"*γ*) parum dilatati. (Gen. Scamballa Leach. Mss. e. p.)." "Spec. 5. Orchestia chilensis M. Edw."; "Spec. 6. Orchestia gryllus M. Edw.", the *Talitrus gryllus* of Bosc.

"*b*) Marium septimi pedum paris tertius et quartus articulus nec in maribus, nec etiam in feminis dilatati. (Gen. Scamballa Leach Mss. List of the Crust. in the Brit. Mus. p. 86.)

"*α*) Chelæ marium inferior margo edentatus." "Spec. 7. Orchestia ochotensis n. sp."

"*β*) Chelæ marium inferior margo plus minusve dentatus." "Spec. 8. Orchestia Bottæ M. Edw.," which he thus defines, on the supposition of the name belonging to a form brought by Nordmann from the Black Sea, "*O. Bottæ* (maris nigri). Antennæ inferiores corporis tertia parte longiores flagello 20-articulato instructæ. Manus secundi pedum paris marium in marginis inferioris dimidio inferiore eminentiis tribus munita, uncoque terminali intus denticulato instructa;" "Spec. 9. Orchestia Deshayesii Audouin . . . . . Scamballa Kuhliana Leach. Mss. teste List of Crust. of the Brit. Mus. p. 86;" "Spec. 10. Orchestia Gryphus F. Müller;" "Spec. 11. Orchestia Quoyana M. Edw."

"*B.* Pedum sextum par septimo longius et latius." "Spec. 12. Orchestia Fischeri M. Edw."

"*Sectio. II. Antennæ superiores pedunculo inferiorum longiores. (Subgen. Allorchestina nob.)*," "Spec. 13. Orchestia nidrosiensis Kröyer;" "Spec. 14. Orchestia Pereiri Lucas."

"Die als Subgenus *Allorchestina* aufgestellte Gruppe sind Orchestien, welche in dem ansehnlichen Längenverhältnisse der obern Fühler zu den untern sich der Gattung *Allorchestes* anreihen und sich nur durch den Mangel der spitzen Kralle an den Maxillarfüssen davon unterscheiden. Dass *O. nidrosiensis* kein *Allorchestes* sei, geht aus Kröyer's Mittheilung hervor, denn er bezeichnet darin den '*ultimus pedum maxillarium articulus*' blos als '*conicus.*' Von *O. Pereiri* ist die Gestalt der Maxillarfüsse leider weder beschrieben, noch abgebildet, so dass sie möglicherweise ein echter *Allorchestes* sein könnte. Uebrigens nähert sich *O. nidrosiensis* wegen des *ultimus articulus pedum maxillarium conicus* auch mehr der Gattung *Allorchestes*, als die in der *Sectio I.* angeführten Orchestien."

"*Orchestiarum species non satis vel nondum descriptæ.*" "Spec. 15. Orchestia Tristensis (Scamballa Tristensis Leach. Mss.)"; "Spec. 16. Orchestia megalophthalmos (Scamballa megalophthalmos Leach. Mss.)." These two might come, he thinks, into his *Sect. I. α, γ* after *Orchestia gryllus* or into *Sect. I. b.* He considers "Oniscus gammarellus Pall. Spicil. Zool. fasc. IX. p. 57, Pl. IV. fig. 8," and "Oniscus Stroemianus O. Fabric. Faun. groenl. p. 261," also as doubtful species.

"Orchestiæ ad alia genera spectantes." "Spec. 1. Orchestia grandicornis Kröyer . . . = Allorchestes grandicornis."; "Spec. 2. Orchestia longicornis M. Edw.," with *Talitrus longicornis*, Say, and *Scambalda longicornis*, Leach, Mss. This species, he thinks, is closely allied to, if not identical with, his own *Megalorchestes californianus*.

This portion of Brandt's paper concludes with remarks on *Orchestia gryllus*, for which the name *Scambalda Sagana*, Leach's MSS., is given in the List of Crust. Brit. Mus. 1847.

The remainder of the paper, pages 310–313, treats of "*Megalorchestia* eine neue Gattung der Amphipoden aus der Gruppe der Orchestiden." This new genus, he says, to some extent by the form of the first gnathopods inclines towards *Talitrus*, by the second gnathopods more to *Orchestia*, by the maxillipeds to *Allorchestes*, from which last it is again removed by the very short upper antennæ. For the name he says, "Ich bezeichne sie nach Maassgabe der Grösse der ihr zum Grunde liegenden Art als *Megalorchestia*." This genus is a synonym of Orchestoidea, Nicolet, 1849. Brandt defines it thus:—

"Pedum primi paris ultimus articulus etiam in maribus apice angustatus (Tab. 1. fig. 12).—Pedum secundi paris ultimus articulus marium semper maximus, cheliformis. Pedum maxillarium articulus ultimus angustatus, apice unguiculatus. Antennæ superiores pedunculo inferiorum breviores." The type-species, *Megalorchestia californiana*, is described and figured with much detail. The telson is described as "lamina caudalis simplex cordata in medio dorsi longitudinaliter impressa." The plate shows numerous details.

Talitrus longicornis, Say, the *O.* (*Scambalda*) *longicornis* of Leach's MSS. is discussed as offering "? Spec. 2. *Megalorchestia longicornis*."

In regard to *Talitrus eloquii*, see Note on Savigny, 1825; the subgenus *Talitrorchestia*, resting only on the obscure figure of that otherwise undescribed species, has never met with acceptance. Of *Orchestia ochotensis*, Spence Bate in the Brit. Mus. Catal., p. 369, says, "this species appears to differ but little from Dana's figure of *O. Pickeringii*." For *Orchestia nidrosiensis*, see Note on Kröyer, 1845.

1851. Brandt, F.

Dr. A. Th. v. Middendorff's Reise in den Äussersten Norden und Osten Sibiriens. Band II. Zoologie. Theil I. Wirbellose Thiere. St. Petersburg, 1851. Krebse, bearbeitet von F. Brandt. pp. 79–148 (1–74). Pl. VI.

The Amphipoda occupy pages 130–144 (54–68) and 511 (74). They are placed in the Subclassis Crustacea Maxillata, Legio Edriophthalma, and embrace two sections, the Gammaracea and Læmodipoda. The new species *Orchestia ochotensis* is described and figured, figs. 18–26, and placed near to "*Orchestia Botta*," provisionally so-named, from the Black Sea. (See the preceding Note.) Brandt reports, as taken by Wosnesenski in the Sea of Okotsk, *Anonyx ampulla*, Phipps, accepting this designation and a long list of synonyms from Kröyer, 1845, for numerous specimens which he had himself examined. On the authority of a letter from Lichtenstein, he adds to the synonymy "*Gammarus Gryllus* Lichenst. apud M.S. Mandt," but as he also specially refers to the Atlas of the Voy. en. Scand. (Livr. 37) Pl. 13, fig. 2 *a–z*, there cannot be any doubt that the species intended is *Cancer* (*Anonyx*) *nugax*, Phipps. He also reports numerous well-preserved specimens of "Anonyx Edwardsii," Kröyer, as having been taken by Wosnesenski, along with one of the preceding species, out of the stomach of a whale captured in the Bay of Metschigmensk. In the genus *Gammarus* he takes Section 1. A. *a.* Milne-Edwards, with "the inner branch of the third uropod as large as, or at least more than half as long as, the outer," to include "Spec. 1. *Gammarus locusta?*" from the river Doschkander flowing into the Sea of Okotsk: "Spec. 2. *Gammarus pulex*, De Geer," taken in the basin of the hot-springs of Natschik,

and "Spec. 3. *Gammarus sitchensis*," n. s., fig. 28, *a–c*, from the Island of Sitcha, intermediate between *Gammarus locusta?* and *Gammarus pulex* and *fasciatus*, Say. This Boeck unites to *Gammarus locusta*, in regard to which species Brandt makes vigorous efforts to disentangle the confusions of the early writers. Under β with "the inner branch of the third uropod not even, or at most, a quarter as long as the outer, and often only rudimentary, he places "Spec. 4. *Gammarus atchensis*," n. s., fig. 29, *a–c*, from Atcha and Unalaschka; "Spec. 5. *Gammarus locustoides*," n. s., fig. 30, *a–c*, from Ayan on the sea of Okotsk; "Spec. 6. *Gammarus ochotensis*," n. s., fig. 31, *a–c*, from the same sea, and "Spec. 7. *Gammarus longicauda*," n. s., fig. 32, *a–c*, allied to *Gammarus dentatus*, Kroyer, with which Spence Bate was inclined to unite it, while under the name of *Melita dentata*, Kroyer, Boeck actually does so.

A form from the Sea of Okotsk, which Brandt at first took for an *Amphithoe*, he decides to place in Dana's genus *Allorchestes* as *Allorchestes ochotensis*, n. s., fig. 27, *a–f*, near to "*Amphithoe Marionis*," Milne-Edwards. To *Allorchestes* he also refers *Orchestia grandicornis*, Kroyer. Both should rather be referred to *Hyale*, Rathke. (See Note on Rathke, 1837.) Of the telson of his species Brandt says, "Der Schwanzanhang besteht aus zwei abgerundet-rhomboidalen, kurzen, am Ende verdickten, mit einzelnen Dornchen versehenen Plättchen," thus affording an additional reason against applying the name *Allorchestes* to species with an entire telson. In the Brit. Mus. Catal., 1862, on Plate 1*a*, for "4. O. Ochotensis.," should be read 4. A. Ochotensis., for "6. O. Ochotensis.," 9. O. Ochotensis., and for "9. O. brevicornis.," 6. T. brevicornis.

Among the Læmodipoda Brandt gives, from Nichta Bay in the Sea of Okotsk, *Caprella affinis*, n. s., like *Caprella linearis*, Johnston (1835), but differing from it in the greater size of the hands of the first gnathopods, which are more than half the size of those of the second gnathopods, and in the much longer, untoothed, penultimate joint of the hinder pair of feet, which appears longer than the two preceding joints. *Caprella nichtensis*, n. s., he compares with *Caprella lobata*, Müller (Kröyer, *Voy. en Scand.* pl. 25. fig. 3). Mayer does not find himself able to identify either of these two unfigured, briefly described species, or even to decide whether they belong to the genus *Caprella* at all.

Spence Bate in his B. M. Catalogue founds a new genus, *Brandtia*, for a species which he refers to as "Gammarus latissimus, *Brandt, Voyage de Middendorff*," with "*Hab.* (Aretic Asia?) *Voyage de Middendorff*." The figures and description were taken by Sp. Bate from specimens which Professor Brandt had sent to the Museum at Paris, but the species *Gammarus latissimus* was instituted by Gerstfeldt in 1858, and was found by Maack in the Angarà at Irkutsk.

1851. Costa, Achille.

March.

Fauna del Regno di Napoli.

Genere Callisoma; *Callisoma*, (Costa).

The genus *Callisoma*, named in 1840 by O. G. Costa, is now described :—"Generis characteres essentiales. *Antennæ superiores* capite paulo longiores, validissimæ, subulatæ, pedunculo crassissimo, bisetæ: *inferiores* graciles, longiusculæ. *Pedes* quatuor antici graciles haud cheliformes, secundi longiores. *Epimera* articuli quarti thoracici clypeiformia, inferne postice producta. Characteres naturales. *Corpus* compressum, breviusculum, e latere subovatum. *Antennæ superiores* breves, capite idem ac inferiorum pedunculo paulo longiores; pedunculi articulo primo crassissimo, duobus sequentibus longitudine et crassitie decrescentibus; setis duabus pluri-articulatis, seta primaria crassa subulata, pedunculo breviore; secundaria minuta gracili. *Pedes* primi paris graciles, manu simplici unguiculata terminati: secundi anterioribus fere similes at longiores: trium parium posticorum articulo primo

dilatato scutiformi. *Epimera* satis lata : quarti articuli majora, inferne postice distincte producta, illa articuli quinti circum-dantia."

"*Callisoma punctata*, O. G. Costa," is described and figured. The short definition is :—"C. corpore dimidio fere longitudinis alto, epimeris articuli quarti thoracis postice ad illorum quinti angulum infero-posteriorem usque productis ; carneus, maculis punctiformibus crebris ordinatis rubro-sanguineis pictus ; oculis nigris, antennis pedibusque pallidis.—Long. lin. $3\frac{1}{2}$; alt., max. lin. 1 4/10."

"*Callisoma Hopei*" is also described and figured, being distinguished from *Callisoma punctatum* chiefly by the absence of the dendritic spots, and by the different development and shape of the side-plates. The genus *Lysianassa*, Milne-Edwards, and the type species *Lysianassa costæ*, Milne-Edwards, are described.

1851. April. The genus *Talitrus*, Latreille, is described, and *Talitrus platycheles*, Guérin, is described and figured. The genus *Orchestia*, Leach, is described, and the species *Orchestia deshayesii*, Audouin, is described and figured.

1851. HOPE, FREDERICK WILLIAM, born January 30, 1797, died April 15, 1862 (J. O. Westwood).

COSTA, ACHILLE.

Catalogo dei Crostacei Italiani e di molti altri del Mediterraneo per Fr. Gugl. Hope. Napoli, 1851. 48 pages. 1 Plate.

Though A. Costa's name does not appear on the title page the work appears to be at least as much due to him as to the Rev. F. W. Hope.

The Catalogue differs so strikingly from most catalogues of Amphipoda that I give the Amphipodan portion in full.

AMPHIPODA.

Phronima, Lat.

1	Sedentaria, Forsk.	Medit
2	Custos, Risso	Nizza

Phrosine, Risso.

1	Semilunata, Risso	Napoli
2	Macrophthalma, Risso	Nizza

Orio, Cocco.

1	Zancleus, Cocco	Sicilia
2	Ornithoramphus, Cocco	Id.
3	Oxyrhynchus, Prest.	Id.

Cheiropristis, Cocco.

1	Messanensis, Cocco	Sicilia

Ornithoramphus, Nat.

1	Coccoi, Nat.	Sicilia

Carcinococcus, Nat.

1	Costæ, Nat.	Sicilia
2	Ovatus	Id.
3	Poweriæ	Id.

Elasmocerus, A. Costa.

1	Speciosus, A. Costa	Napoli

Orattrina, Nat.

1	Pulchella, Nat.	Messina

Erpetoramphus, Nat.

1	Costæ, Nat.	Messina

Gammaridæ.

Talitrus, Lat.

1	Locusta, Fab.	Sicilia
2	Niceensis, Risso	Nizza
3	Rubropunctatus, Risso	Id.
4	Platycheles, Guér.	Napoli

Orchestia, Leach.

1	Gammarus, Risso / *littorea*, Leach	Nizza
2	Deshayesii, Aud.	Napoli
3	Montagui, Audouin	Medit.

Atylus, Leach.

1 Carinatus, Fab. . . . Medit.

Callisoma, Costa.

1 Punctatum, Costa . . Napoli
2 Hopei, A. Costa . . . Id.

Lysianassa, Edw.

Costæ, Edw., . . . Napoli

Gammarus, Leach.

1 Pulex, Fab. . . Napolir
2 Marinus, Leach . . Medit.
3 Olivii, Edw. . . Napoli
4 Locusta, Fab. . . . Medit.
5 Longicauda, A. Costa . . Napoli
6 Pungens, Musig. . . Cesena
7 Peloponesius, Guerin . . Morea

Cephalaspis, A. Costa.

1 Seticauda, A. Costa . . Napoli

Dexamine, Leach.

1 Pelagica, Risso . . . Nizza
2 Spinosa, Mont. . . . Napoli

Enone, Risso.

1 Punctata, Risso . . . Nizza

Leucothoe, Leach.

1 Articulosa, Mont. . . Napoli
2 Parthenopaea, A. Costa . . Id.

Seina, Prest.

1 Ensicorne, Prest. . . Sicilia

Amphithoe, Leach.

1 Pausilippii, Edw. . . Napoli
2 Inaequipes, A. Costa . Id.
3 Prevostii, Edw. . . . Id.
4 Gracilis, A. Costa . . Napoli

Amphithonotus, A. Costa.

1 Acanthophthalmus, A. Costa . Napoli

Epimeria, A. Costa.

1 Tricristata, A. Costa . . Napoli

Audouinia, A. Costa.

1 Acherusica, Costa . . Fusaro

Corophium, Lat.

1 Longicorne, Fab. . . Antibo

Sunnazaria, Costa.

1 Pallida, Costa . . . Napoli

LAEMODIPODA.

Caprellidæ.

Caprella, Lam.

1 Phasma, Mont. . . . Napoli
2 Linearis, Lat. . . . Nizza
3 Punctata, Risso . . . Id.
4 Acutifrons, Desm. . . Napoli

Cyamus, Desm.

1 Ceti, Fab. . . . Nizza
2 Acutifrons, Costa . . Sicilia
3 Littoralis, Muller . . Nizza

As genera incertæ sedis are given Hexona and Zuphea of Risso, with their respective species Parassitica and Sparicola. An addendum is given *Generi* Amphithonotus. Guttatus. A. Costa, Napoli.

Among the Asellidæ, Leach, are placed *Apseudes*, Leach (*Euphcus*. Risso), with the species *ligioides*, Risso; *Tanais cavolini*, Edw.; *Oliska penicillata*, Risso. The Pranizidæ, Hope, contain eleven species of *Praniza*, and *Ancæus forficularis*, Risso.

The first Amphipod-species described, and the only one figured, is "*Callisoma Hopei*, A. Costa," fig. 2. This is considered by Boeck as the type species of Costa's genus *Callisoma*, but the description says "Secunda haec generis *Callisoma* species facile a C. punctato distinguitur corpore minus elevato; colore roseo vel subflavescente immaculato; epimeris quarti articuli thoracis inferne postice ad illorum quinti articuli medium marginis inferioris, neque ad angulum infero-posteriorem usque productis. Long. lin. 2." The *Callisoma punctatum*

from which it is here distinguished was named *Callisoma punctata* by O. G. Costa in 1840, but not described till 1851 (see preceding Note). It must be considered the type of the genus, as Spence Bate suggests, Brit. Mus. Catal., p. 84, note, though he had not been able to find the description of it. Costa's species *Gammarus montanus* from Lago del Matese, and *Gammarus longicaudatus* from the drinking water of Naples, are given here for the first time. They are not mentioned in the B. M. Catalogue, from which *Amphithoë inæquipes* and *Amphithoë gracilis* are also omitted. All these four are described at length in Costa's R. s. Crost. Amf. d. R. d. Napoli.

The genus *Amphithonotus*, A. Costa, is thus explained:—"Illis ex Amphithois speciebus constitutum est hoc genus, quæ dorsum vel omnino carinatum et spinosum, vel saltem quibusdam abdominis articulis si non et thoracis postice in spinam vel dentem productis habent; ex quo peculiarem habitum præbent. Amph. marionis, Edw.; panopla, Kroyer; carinatus, ejusd. et quæ sequuntur ad hunc genus pertinent." The type species, *Amphithonotus acanthophthalmus*, A Costa, which is here said to be "*affinis Amph. marionis*," was afterwards, under the name *Amphithonotus marionis*, by Costa himself made a synonym of "Amphithoe marionis, Edw.," and must, as Boeck says, be included along with that species in the synonymy of *Dexamine spinosa*. The next species, given as *Acanthonotus guttatus*, A. Costa, and said to be very near to *Amphithoe carinata*, is evidently meant for *Amphithonotus guttatus*, as given in the addendum above mentioned. Costa in his subsequent work does not notice this, but silently transfers the species to his genus *Nototropis*, which Spence Bate and Boeck agree in referring to the genus *Atylus*, Leach, and also agree in misspelling *Notrotopis*, though Costa gives the derivation *νῶτος*, back, and *τρόπις*, keel. The species *guttatus* is omitted from the B. M. Catalogue. Since both the species, *acanthophthalmus* and *guttatus*, belonged to genera already established, the genus *Amphithonotus*, created to receive them, must be considered to have perished at its birth.

The genus *Epimeria*, A. Costa, is thus defined:—"Hoc genus, Amphithois et Amphithonotis maxime affine, epimeris quarti et quinti articuli thoracis elatis, cæteris valde majoribus, simul clypeum sæpius inferne emarginatum formantibus, dignoscendum. Dorsum fere ut in Amphithonotis."

Of this genus, Spence Bate remarks that it apparently "differs in nothing from *Acanthonotus* of Owen, of which probably it is a synonym." Boeck does not accept this view, but he identifies both the type species, *Epimeria tricristata*, A. Costa, and *Acanthonotus owenii*, Bate and Westwood, with *Gammarus corniger*, Fabricius, 1779, under the name *Epimeria cornigera*. The Brit. Mus. Catal., in rendering the above generic definition, says, "Coxæ of the first and second pairs of pereiopoda long, the rest considerably broader," but Costa's meaning is that the coxæ or side-plates of the second and third pairs of peræopods are prominent, very much larger than the rest.

In Hope's Catalogue it may be observed that he inserts *Orio ornithorumphus*, Cocco, as well as *Ornithorumphus coccoi*, Natale, although de Natale clearly explains that his species is the same as Cocco's. As to the genus *Carcinococcus* and the species assigned to it, de Natale, 1850, says, "Finalmente il mio Carcinococcus andrà tra gli Stomapodi Unicorazzati, Erietini—Dedicandone la specie al mio Maestro il Prof. Costa di Napoli—ho voluto foggiarne il nome suo Carcinococcus; da quello dell' illustre Prof. Cocco, ad imitazione di Carlo Luciano Bonaparte che sopra uno Scopelino scoperto dal Ch. Ittiologo di Messina foggiò il suo Ichthiococcus—di cui le specie *Oratus*, e *Porcria* sono proprie del nostro piato." Hence these three species are here quite out of place. *Leucothoe parthenopæa* Costa subsequently withdrew. His later *Corophium acherusicum* and *Vibilia speciosa* probably answer to *Audouinia acherusica* and *Elasmocerus speciosus*. There are several other genera and species named, of which I can give no account. Some of them are perhaps described in de Natale's letter to Achille Costa, of which I extremely regret that I have never been able to obtain or see a copy. (See Appendix.)

1851. Liljeborg, Wilh.

Bidrag till Norra Rysslands och Norriges fauna, samlade under en vetenskaplig resa i dessa länder 1848. Inlemnad d. 11 December 1850. Kongl. Vetenskaps-Akademiens Handlingar för år 1850. Sednare Afdelningen. (This continues apparently Kongl. Vetenskaps-akademiens Handlingar, för år 1849. Stockholm, 1851.) pp. 233–341.

At page 311 he mentions having observed "vid Schuretskaja i Ryska Lappland," among the Crustacea, "*Gammarus locusta*, Mont., Kröy.;" "*Anonyx* Edwardsii, Kröy.;" "Caprella lobata (Muell.); Kröy."

At page 346 occurs the heading, "Förteckning öfver de af mig i trakten af Tromsö i Norge observerade Däggdjur, Foglar etc." Among the Tromsö Crustacea are the following Amphipoda: —"*Gammarus locusta*, Mont.; Kröy. Varietas: Antennæ superiores inferioribus longiores, et earum pedunculi articulum penultimum pedunc. antenn. infer. excedentes.—*Pardalisca cuspidata*, Kröy.—*Pontoporeia femorata*, Kröy.—*Amphithoë albomaculata*, Kröy.—*Anonyx ampulla* (Phipps); Kröy.—*Ischyrocerus minutus*, n. sp. Antennæ superiores inferioribus *insigniter longiores*, flagello ultimum pedunculi articulum æquante, circiter 6-*articulato*, *articulis elongatis*, flagello appendiculari vix dimidiam primi articuli flagelli proprii longitudinem æquante; ultimus pedunculi antennarum inferiorum articulus flagellum circ. 5-articulatum æquans; *manus primi et secundi pedum paris fere æquales*, *subangustæ*. Forma minima. Tantummodo specimen unum, feminam oviferam, circ. 4 mm. longam e profundo majore accepi.—*Leucothoë norvegica*, n. sp. (Tab. xx. fig. 4)." For the description, see Note on Liljeborg, 1850. *Ischyrocerus minutus* is identified by Boeck with *Podocerus anguipes*, Kroyer, but it is more probably the same as the species described by Sars in 1882 as *Podocerus minutus*, n. s.

After some Isopods, Liljeborg also mentions "*Caprella lobata* (Muell.); Kröy."

1851. Liljeborg, Wilhelm.

Norges Crustacéer. Crustacea, a clariss. M. W. v. Dueben in Norvegia ad Christiansund et Bergen 1843–44 collecta. Öfversigt af Kongl. Vetenskaps-Akademiens Förhandlingar. Årg. 8. 1851. No. 1. Stockholm. pp. 19–25.

Of the hundred and six species collected by v. Duben, numbers 34 to 70 belong to the Amphipoda. Many are merely named. On a few, notes are given as follows:—

"34. *Orchestia* litorea, M. E.—Femina a mari tam diversa forma pedum secundi paris, ut illa formam typicam generis *Talitri* M. E. et hic eandem formam gen. Orchestiæ efficere videatur. Femina *Talitro tripudianti* Kr. sat similis est; forma pedum secundi paris prorsus eadem est, longitudo vero pedum quarti et quinti paris diversa, quum hi pedes iisdem secundi paris longiores."

"42. *Anonyx* norvegicus n. sp.—*A. planto* Kr. sat. affinis, diversus tamen: antennis superioribus feminæ et maris fere æqualibus, flagello circ. 14-articulato, flagello appendiculari 5-articulato, artic. primo ceteris vix longiore; antennis inferioribus superioribus insigniter —maris plus quam duplo—longioribus: epimero quarto postice profunde sinuato, epimero quinto mediocri, subquadrato, antecedentibus humiliore. Præterea inter se similes." This in 1865 he identifies with *Anonyx gulosus*, Kroyer.

"51. *Amphithoe* Pausilippi? M. E.—Omnino ei similis, oculi vero non visibiles."

"57. *Gammarus Duebenii* n. sp.—Antecedenti [*Gammarus locusta*, Fabr.] simillimus, tamen distinctus: magnitudine minori; antennis magis hispidis, superioribus longioribus; flagello appendiculari breviore circit. 5-articulato; tuberculis segmenti 4 : i, 5 : i et 6 : i abdominis pilis longis; ramis pedum spuriorum ultimorum insigniter inæqualibus, interiore tertia parte minore &c. Haud infrequens videtur, quum multa adsint specimina. Apud omnia ratio illa inter ramos pedum spuriorum ultimorum plane constat." This in 1854 he makes a synonym of *Gammarus locusta*.

"59. *Gammarus* Sundevallii, H. Rathke. Femina mari dissimilis manibus ped. 1:i et 2:i paris minutis fere æqualibus." This is now known as *Cheirocratus sundevalli*.

"60. *Gammarus assimilis*, n. sp.—Præcedenti simillimus, præcipue diversus: pedibus maris secundi paris longiores [longioribus], manu elongata, fere rectangulari, infra pone unguem oblique truncata et tridentata, antice et postice æqualiter, non dense, pilosa. Inter feminam et marem dissimilitudo eadem ac præcedentis." This is now called *Cheirocratus assimilis*.

"64. *Gammarus* Zebra, H. Rathke.—Generi Ischyroceri, Kr. potius adnumerandus."

"65. *Ischyrocerus* anguipes, Kr.

"66. I. (Podocerus) calcaratus (H. Rathke) Sine dubio eadem species ac antecedens, cujus calcar manus pedum secundi paris non evolutum, sed tantum tuberculo minuto indicatum."

"68. Leucothoë—? Sine dubio juniores *L. clypeatæ*, Kr. Femina ovifera minuta: antennis superioribus inferioribus brevioribus; manu pedum secundi paris mediocri, ovata, margine posteriore medio uni-dentato; præterea *L. clypeatæ* similis. Apud quædam specimina minutissima, sed tamen ovifera, ovis solummodo paucis majoribus, antennæ fere eadem longitudine sunt. manus pedum secundi paris vero eodem modo formatæ." This is now known as *Metopa clypeata*.

Under "Loemodipoda (amphipoda)," he gives

"70. *Caprella* lobata (Müll.); Kr.—Admodum variabilis. Aculei partium superiorum corporis nullam distinctionem specificam præstare videntur. Feminæ plerumque supra sunt aculeatæ, earumque annuli thoracici et manus breviores." This may belong to variety γ of Krøyer's *Caprella lobata*, which Mayer puts, with the other varieties, under *Caprella linearis* (Linné) Bate.

1851. Peters, Wilhelm Carl Hartwig, born 1815 (Hagen).

Bericht über die Leistungen in der Naturgeschichte der Crustaceen, Arachniden und Myriapoden während der Jahre 1849, 1850 und 1851. Archiv für Naturgeschichte. Siebzehnter Jahrgang. Zweiter Band. Berlin, 1851. pp. 393–467.

1852. Burgersdijk, Leonard Alexander Johannes.

Specimen academicum inaugurale, continens annotationes de quibusdam crustaceis indigenis, quod . . . . publico ac solemni examini submittit Leonardus Alexander Joannes Burgersdijk, e pago Alphen Batavus, ad diem xix. m. Junii a. mdcccli. Lugduni-Batavorum.

Burgersdijk is at great pains to discriminate *Gammarus pulex* from Rösel's species which Gervais named *Gammarus roeselii*. It will be useful to see in juxtaposition the synonymy, as he has drawn it up for each species.

"Gammarus pulex

" *Krebsformiger Wasserwurm*, Frisch, Ins. VII, p. 26, Tab. 18.

" *Squilla pulex*, de Geer, Mémoires, VII, p. 525, Tab. 33 (excl. synon.).

" *Gammarus pulex*, Latr., Règne anim. IV, p. 120 (excl. citat. Linnæana).

" *Gammarus pulex*, Desmarest, Consid., p. 266, Tab. 45, fig. 8, 8*a* (excl. synon.).

" *Gammarus pulex*, Zenker, Comment. fig. A, C seqq. (excl. synon.).

" *Gammarus pulex*, Gervais, Ann. des Sc. nat., 2me série, IV, p. 128.

" *Gammarus fluviatilis* et *pulex*, Milne Edwards, Crust. III, p. 45 et 48 (pro parte et excl. synon.).

" *Gammarus fluviatilis*, Milne Edwards, Cuv. Règne anim., éd. ill., Crust., Tab. 60, fig. 1.

" *Gammarus fossarum*, Koch, Deutschl. Crust., Arachn., und Myriap., Heft. 5, Taf. 1.

" *Gammarus fluviatilis*, Zaddach, Prodromus synops. Crust. Pruss. p. 6.

" *Gammarus pulex*, Hosius, Wiegm. Arch. 1850, 1, p. 233.

" *Gammarus aquaticus*, Leach, Linn. Trans. XI. 359.?"

"Gammarus Roeselii Gerv.

" *Squilla fluviatilis*, Roesel, III, Tab. 62.

" *Cancer locusta*, L., Sulzer, Insect., fig. 152.

" *Crevettes des ruisseaux*, Geoffroy, Insect. II, pag. 667, Tab. 21, fig. 6.

" *Gammarellus pulex*, Herbst, Krabben und Krebse, II, pag. 132, Tab. 36, fig. 4, 5.

" *Gammarus pulex*, Latreille, Hist. natur. des Crust. et des Ins., VI, pag. 316, Tab. 57, fig. 1.

" *Gammarus Roeselii*, Gervais, l. l.

" *Gammarus pulex*, Koch, libr. l. Heft. 36. Taf. 21.

" *Gammarus Roeselii*, Hosius, l.l."

(In reference to this list he notes that Sulzer's and Geoffroy's figures are copied from Roesel's figure.)

Zenker's varieties of *Gammarus pulex*, *longicaudatus* and *brevicaudatus*, Burgersdijk says he has found mixed together (promiscue). After giving his reasons in full for the synonymy to *Gammarus pulex*, he adds, "Neque Linnæum neque Fabricium citavi, quia plures species confundebant, sic in Linnæi Syst. Nat. Ed. XII, *Cancer pulex*, teste synonymia, continet *Gammarum Roeselii*, *Gammarum* hunc *pulicem*, et *Orchestiæ* speciem; *Gammarus Roeselii* etiam sub nomine *Cancris locustæ* militat; in Fabrici Ent. Syst. II, pag. 516 sub *Gammaro locusta* et *pulice* similis est confusio." From want of materials he refrains from discussing *Gammarus puteanus*, Koch, called by Gervais *Gammarus pulex minutus*, and concludes the subject with the remark, "si tribus hisce speciebus, *G. Roeselii*, *pulici*, *puteano* additur *G. ambulans* Fr. Müller (Wiegm. Arch. 1846, I, pag. 296), nulla omissa erit e speciebus aquæ dulcis, quæ hucusque in Europa repertæ sunt." Here however he reckons without the *Gammarus* (*Niphargus*) *pungens* from the warm springs in Italy, of which we find notice in Ray.

A short chapter is given on *Gammarus locusta*, for which he cites as authorities Leach, Desmarest, Kröyer, Milne-Edwards and Zaddach. He thinks that Guérin's figure in the Iconographie, Crust. Tab. 26, probably represents *locusta*, but points out that the upper antennæ in fig. 7 are shorter, in fig. 7*a* much longer, than the lower. Nor does he include in the synonymy Montagu's *Cancer* (*Gammarus*) *locusta*, since it has the upper antennæ much shorter than the lower.

1852. Couch, Richard Quiller, born March 14, 1816, died May 8, 1863 (W. Pengelly).

On some of the rarer forms of Cornish Crustacea. Transactions of the Natural History and Antiquarian Society of Penzance. Volume II. 1851–1855. Penzance, 1864. (Report for MDCCCLI, apparently published in 1852.) pp. 95–99.

In "Class Crustacea. Subclass *C. mandibulata*," Couch gives definitions of the two genera *Caprella* and *Proto*. In the first he describes 1. *Caprella phasma*, Montagu's Cancer phasma; 2. "*C. Acanthifera*," for which he gives "*C. Acanthifera*, Johnston, Mag. Nat. History, Vol. vi., p. 40, fig. 7*a*:—Vol. viii. fig. 70, p. 671.", as his authority; 3. "*C. Pennantii*," with references to "*Cancer Atomos*, Stew. Elem., Vol. ii., p. 317; *Astacus Atomos*, Pennant, Brit. Zool., Vol. iv., Pl. 13, fig. 2."; 4. "*C. Linearis*," with reference to *Cancer linearis*, Lin., *Cancer lobatus*, Stewart, *Caprella linearis*, Johnston; "the head is obtuse, and the species the shortest and stoutest of any found in our seas, with no spine along the whole of the dorsal surface." *C. spinulata* (Couch), is thus described:—"Long and slender: the head is larger than the next articulation, and without a spine; the occipital articulation with a spine near its posterior margin, and there is one on the next ring above the branchiæ; there are two on the third, one above the branchiæ, one near its posterior margin, and one on the centre of each of the others. Superior antennæ as long as the body, basal joint small, the second about four times as long as wide, the third long and slender and slightly enlarged towards its distal extremity, the last multi-articulate and ciliated; the inferior antennæ much smaller than the others; at the lower part of the head two pedipalpi, small and bifid at their extremities. The hand very large, moveable joint long, slender, and hooked, and at its point, when bent, touches a spine on the hand." Mayer thinks these characters would suit *C. acanthifera*, but recognises the uncertainty. The "occipital articulation with a spine" is a little suggestive of *Ægina spinosa*, Boeck. Lastly, he describes *Proto pedatus*, without naming any authority.

1852. Dana, James D.

Conspectus Crustaceorum quæ in Orbis Terrarum circumnavigatione, Carolo Wilkes *e Classe Reipublicæ Fœderatæ Duce, lexit et descripsit* Jacobus D. Dana. Pars III. Amphipoda. No. 1. Proceedings of the American Academy of Arts and Sciences. Vol. II. From May, 1848, to May, 1852. Boston, Cambridge, 1852. pp. 201–220.

This paper contains only Dana's own new species. In "Subtribus 1. Gammaracea. Familia 1. Orchestidæ. *Palpus mandibularis* obsoletus. *Corpus* compressum, epimeris latis. *Styli caudales* duo postici breviores," he gives genus 1. *Talitrus*, Latreille, "*Pedes* primi styliformes, secundi vel non subcheliformes vel manu debilissimâ confecti. *Antennæ* primæ basi inferiorum breviores," with the species *Novi-Zealandiæ, gracilis, ornatus*: genus II. *Talitronus*, Dana, "Pedes secundi manu valido prehensili confecti. Alias *Talitro* similis," with the species *insculptus* which he afterwards identified with *Orchestoidea tuberculata*, Nicolet, as an *Orchestia*, dropping both his own genus *Talitronus* and *Orchestoidea* of Nicolet; genus III. *Orchestia*, Leach, with the species *sylvicola, tenuis, rectimanus, spinipalma, scutigerula, nitida, dispar, quadrimanus, serrulata*: genus IV. *Allorchestes*, Dana, with the species *compressa, verticillata, hirtipalma, gracilis, peruviana, humilis, australis, brevicornis, Novi-Zealandia, intrepida, orientalis*, and *Allorchestes? graminea*.

In "Familia II. Gammaridæ. *Maxillulæ* palpigeræ. *Corpus* sæpius compressum. *Antennæ* flagello confectæ, non pediformes. *Styli caudales* duo postici sive longi sive breves. *Animalia saltatoria vel natatoria*," he gives the following arrangement, "Subfamilia I. Lysianassinæ. *Antennæ primæ* basin crassæ. *Epimera* grandia. Pedes sex postici non prehensiles," including *Lysianassa Brasiliensis*, *Uristes gigas*, *Stenia Magellanica*. "Subfamilia II. Gammarinæ. *Antennæ primæ* basin tenues. *Epimera* sive grandia, sive angusta. *Pedes sex postici* non prehensiles. Genus I. Gammarus. *Pedes* primi secundique subcheliformes, digito uni-articulato, reliqui non prehensiles, sex posticis similibus. *Antennæ* secundæ sub primas insitæ, primæ appendiculatæ," with the species described under various sections and subsections, of two main divisions, "I. Manus pedum 2dorum pollice elongato non armata," containing the species, *asper*, *Sulmensis*, *albidus*, *hirsuticornis*, *emissitius*, *tenuis*, *furcicornis*, *tenellus*, *orientalis*; "II. Manus una paris secundi validissime cheliformis, pollice valde elongato; altera parvula. (*Gen.* Mæra, *Leachii.*)," containing *Gammarus* (*Mæra*) *quadrimanus*, *Gammarus* (*Mæra*) *validus*, *Gammarus* (*Mæra*) *setipes*, *Gammarus* (*Mæra*) *pilosus*. "Genus II. Amphitoë. *Gammaro* affinis. *Antennæ* superiores non appendiculatæ. A. Antennæ superiores longiores," including in this division, under sections and subsections, species named *peculans*, *fissicauda*, *pubescens*, *Amphitoe* (*Melita*) *inæquistylis*, *Pecteriana*, *tenuicornis*, *Indica*, *rubella*, *furcorum*, *Tongensis*, *peregrina*, *brevipes*, and under "B. Antennæ superiores breviores. (Genus Iphimedia, *Rathke.*)," *Iphimedia simplex* and "*Iphimedia* (*Acanthosoma*, Owen) *nodosa*." "Genus III. Œdicerus. (*Krüger*). *Amphitoe* pedes 4 anticos membraque buccalia affinis. Pedes septimi valde elongati, tenues, fere filiformes. Epimera mediocria," with the species *Œdicerus Nori-Zealandiæ*. "Genus IV. Erichthonius? (*M. Edwards.*). *Antennæ* elongatæ. *Pedes* primi plus minusve cheliformes, secundi valde cheliformes, digito biarticulato, pollice prominente. *Epimera* sat angusta aut latiuscula. *Cauda* subsaltatoria.

"Erichthonii gressorii (caudâ non saltatoriâ), M. Edwardsio auctoritate, et epimera carentes. Forsan genus hic descriptum Erichthonio discrepat et novum. Hoc credente, genus Pyctilus (a πύκτης, pugil) in manuscriptis auctore institutum est," with the species *Erichthonius* (*Pyctilus?*) *macrodactylus* and *Erichthonius* (*Pyctilus?*) *pugnax*.

"Familia III. Corophidæ. *Corpus* plus minusve depressum, lineare, abdomine recto, articulos normali, epimeris angustissimis vel obsoletis. *Maxillulæ* palpigeræ. *Antennæ* pediformes. *Animalia gressoria*. Genus I. Corophium. *Pedes* secundi non subcheliformes digito nullo 2-articulato. *Antennæ* 2dæ flagellis carentes," has only the obscure species *Corophium quadriceps*, described from a specimen perhaps not adult. "Genus II. Clydonia. (*Dana*). Corpus elongatum, paulo depressum. Abdomen 6–7 articulatum. Antennæ quatuor; duæ elongatæ, styliformes, rectæ et rigidæ, articulo basali brevi, reliquâ parte longissimè subulatâ obsoletè multi-articulatâ. Pedes tenues, 6 postici longè filiformes, quintis longissimis," has the species *Clydonia gracilis* and *Clydonia longipes*, "*C. gracili*, similis." Bovallius, 1886, identifies this genus with *Typo*, Milne-Edwards.

"Familia IV. Ieilidæ. *Corpus* valde compressum, latum, vix lineare, abdomine articulos normali, valde inflexo. *Pedes* plerumque latè expansi instar Aranei. *Antennæ* quatuor flagellis confectæ, non pediformes. *Animalia gressoria*. *Genus* Ieilius. *Antennæ* elongatæ, secundæ longiores. *Pedes* non prehensiles, toti vergiformes, apicem unguiculati. *Styli caudales* sex furcati." This genus receives the single species, *Ieilius ovalis*, of which the specific name was afterwards changed without notice into the better Latin *Ieilius ellipticus*. In regard to his *Amphitoe brevipes*, in which the second gnathopod is large in the male but small in the female, Dana adds to his description the remark, "Microcheli, generi non vero, ut mihi videtur, femina *A. brevipedis* forsan pertinet."

1852. Dana, James Dwight.

On the Classification of the Crustacea Choristopoda or Tetradecapoda. The American Journal of Science and Arts. Second Series. Vol. XIV. November, 1852. New Haven. Number XLI. Appendix. pp. 297–316.

"The term Choristopoda, applied to the Tetradecapoda, alludes to the subdivision of the thorax into segments, each devoted to a separate pair of legs; this is a prominent peculiarity of the species, distinguishing them from all the Podophthalmia, and with rare exceptions from the Entomostraca."

"The Amphipoda are uniformly characterized by having—

"1. The three posterior pairs of thoracic legs thrown backward and more or less obliquely forward, and constituting one series, while the four anterior pairs are thrown forward and outward, in another series; this arrangement may be represented by the figures 4 : 3, (or 2 + 2 : 3, as the four pairs of the first series are often in two sets of two pairs each).

"2. The branchial appendages thoracic.

"3. The abdominal members in two sets, the three anterior pairs subnatatory, the three posterior styliform—an arrangement represented by the figures 3 : 3."

From these he distinguishes the Isopoda, and places *Arcturus*, *Tanais*, &c., in an intermediate group or tribe called Anisopoda.

"The Amphipoda contain two prominent divisions, distinguished by the organs of the mouth, the eyes and general habit, the Gammarus and Hyperia sections, as laid down by Edwards. The addition of the Læmipoda to the Amphipoda introduces a third division. The sections are hence:—

"Subtribus I. Caprellidea.—Maxillipedes elongati, palpiformes. Caput oculique mediocres. Abdomen obsolescens.

"Subtribus II. Gammaridea.—Maxillipedes elongati, palpiformes. Caput oculique mediocres. Abdomen appendicibus sex natatoriis sexque styliformibus instructum.

"Subtribus III. Hyperidea.—Maxillipedes abbreviati, lamellati, operculiformes. Caput grande, oculorum corneis plerumque tectum. Appendices abdominales ac in Gammarideis, latius lamellatæ.

"The Caprellidea have the habit of certain of the Anisopoda, and their short abdomen calls to mind the Isopoda. They therefore properly stand first among the Amphipoda."

The first subtribe, Caprellidea, contains:—Fam. 1. Caprellidæ, with the genera, 1. *Proto*, Leach; 2. *Protella*, Dana. "Mandibulæ palpigeræ. Branchiæ segmentis 3tio 4toque affixæ. Pedes 3tii 4tique obsoleti articulo 1mo styliformi excepto.;" 3. *Caprella*, Lamk.; 4. *Ægina*, Kröyer; 5. *Cercops*, Kröyer; 6. *Podalirius*, Kröyer. Fam. 2. Cyamidæ, with one genus *Cyamus*.

On subtribe II. Gammaridea, he remarks:—"[Among the Gammaridea, the author finds that the posterior caudal stylets offer important characters for distinguishing natural groups or genera, and upon this ground, some new genera have been recognized among the Corophidæ and Gammaridæ, and others *that have been rejected* are sustained. Thus *Iphimedia* is distinct from *Amphithoe*, *Mæra* and *Dercothoe* from *Gammarus*, etc.]." He then gives Fam. I. Dulichidæ. G. 1. *Dulichia*, Kroyer. Fam. II. Cheluridæ. G. 1. *Chelura*, Philippi. Fam. III. Corophidæ. Subfam. 1. Clydoninæ.—"Styli caudales sex simplices, subulati." *Clydonia*, Dana, Amer. J. Sci. [2], viii, 140.

"Subfam. 2. Corophinæ. Antennæ plus minusve pediformes. Styli caudales 1mi 2dique biramei. A. Digitus nullus 2-articulatus. 1. *Styli caudales 3tii minuti, simplices, 2di 1mique ramo externo cultriformi.*" G. 1. *Corophium*, Latr.; G. 2. *Siphonœcetes*, Kröyer. "2. *Styli caudales 3tii minuti, vix exserti, simplices, 2di 1mique ramis extus non præcipue*

spinosis nec cultriformibus, interdum nullis." G. 3. *Platophium*, Dana.—"Corpus superne visum subellipticum, abdomine bene inflexo. Antennæ flagello brevi sæpe instructæ, inferiores longiores, superiores appendiculatæ. Pedes 1mi 2diique subchelati, 2dis validioribus. Pedes 10 postici mediocres." G. 4. *Cyrtophium*, Dana. "*Platophio* similis. Antennæ superiores non appendiculatæ." 3. *Styli caudales 3tii parvuli, biramei, ramo externo non uncinato, 2di 1miique ramis extus non præripue spinosis nec cultriformibus.*" G. 5. *Unciola*, Say. "4. *Styli caudales 3tii paulo elongati, biramei, ramo externo uncinato.*" G. 6. *Podocerus*, Leach.—"Pedes 1mi 2dique subchelati, 2dis validioribus. Antennæ superiores breviores, non appendiculatæ. [An maris digitus 2dus interdum 2-articulatus Kröyero teste.]." In a note he observes, "*Jassa* of Leach may without inconvenience be united to *Podocerus*, as there is no essential generic difference between them." The same remark has been applied by later writers to the next genus, G. 7. *Cratophium*, Dana, "Pedes 1mi 2dique subchelati, 2dis validioribus. Antennæ superiores breviores, appendiculatæ." "B. Digitus 2dus 2-articulatus." G. 8. *Cerapus*, Say. "Antennæ pediformes, subæquæ, flagellis carentes. Pedes 1mi 2dique prehensiles, 1mis parvulis, 2dis manu bene confectis. Styli caudales 3tii biramei, ramis subæquis, longiusculis. [Tubum membranaceum inhabitat]," in which definition the account of the third uropods is rather to be remarked than accepted; G. 9. "*Cerapulina*, Edw. (*Cerapus*, Templeton);" G. 10. *Erichthonius*, Edw.

Subfam. 3. Icilinæ. "Antennæ non pediformes nec subpediformes, flagellis sat longis basique sat brevi instructæ. Styli caudales ac in *Corophiinis*." G. 1. *Icilius*, Dana. Pedes toti unguiculati et tenues, 4 antici longi, non prehensiles, ciliati, 10 postici fere similes. Antennæ superiores breviores non appendiculatæ." G. 2. *Pterygocera*, Latr.

Fam. IV. Orchestidæ, is introduced with the note:—"The author gives a different arrangement of the species of Orchestidæ from that published in this Journal, [2], viii, 135 and ix, 295, and rejects the genus Talitronus, there instituted. He follows Fr. Müller (Archiv f. Nat., 1848, 53) in considering the Talitri and Orchestiæ as forming a single genus, his recent investigations confirming this view. The Gammaridæ also are rearranged." He then gives

"G. 1. Orchestia.—Maxillipedes non unguiculati. Antennæ 1mæ basi 2darum breviores. Epimeræ 5tæ 4tis parce breviores.

"Subgen. 1. Talitrus.—Pedes 1mi *maris feminæve* manu non instructi.

"Subgen. 2. Talorchestia, *D.*—Pedes 1mi *maris* ac in *Talitro, femineæ* manu parvulâ instructi.

"Subgen. 3. Orchestia.—Pedes 1mi *maris femineæque* manu plus minusve instructi.

"G. 2. Allorchestes, *Dana*.—Maxillipedes unguiculati. Antennæ 1mæ minores, basi 2darum longiores. Epimeræ 5tæ 4tis sæpius multo breviores." On the three subgenera see the following note. In the proposed arrangement the older name *Talitrus* should have been assigned to the genus, rather than *Orchestia*.

Fam. V. Gammaridæ, contains—

Subfam. 1. Stegocephalinæ. G. 1. *Stegocephalus*, Kroyer.

Subfam. 2. Lysianassinæ. G. 1. *Lysianassa*, Edw.; G. 2. *Phlias*, Guérin; G. 3. *Opis*, Kröyer; G. 4. *Uristes*, Dana, with a reference to "Amer. J. Sc. [2], viii, 135. The genus *Stenia* is rejected;" G. 5. *Anonyx*, Kröyer; G. 6. *Urothoe*, Dana, "Epimeræ permagnæ, 5tis parvis. Antennæ 1mæ breviores, appendiculatæ, basi sat elongato. Styli caudales postici longi, biramei, ramis foliaceis, ciliatis. Mandibulæ palpo 3-articulato."

Subfam. 3. Leucothoinæ.—"Antennæ superiores basi plus minusve graciles. Maxillipedes elongati, angusti, articulo longo unguiformi confecti, *lamellis internis parvis.* Mandibulæ sive palpigeræ sive non palpigeræ, processu molari carentes. [An semper?] Epimeræ magnæ." G. 1. *Stenothoe*, Dana, "Epimeræ permagnæ, 4tæ maximæ. 5tæ parvulæ. Pedes 4 antici subchelati, 2dis validioribus. Antennæ superiores longiores, non appendiculatæ. Mandibulæ *non palpigeræ, processu molari carentes.* Styli caudales 1mi

2dique ramis bene subulati, 3tii simplicissimi, subulati, spinâ crassâ confecti." G. 2. *Leucothoe*, Leach.—"Epimeræ magnæ, 5tæ parvulæ. Pedes 4 antici subchelati, 2dis validioribus. Antennæ superiores longiores, non appendiculatæ. Mandibulæ palpigeræ. Styli caudales toti biramei, ramis subulatis."

"[Cujus sedis est *Microcheles*, Kröyer, Amphithoe affinis, cui mandibulæ processu molari carentes: quoque *Amphithoe Marionis*, Edw., cui mandibulæ non palpigeræ.]"

Subfam. 4. Gammarinæ, with various divisions and subdivisions, contains G. 1. *Acanthonotus*, Owen; G. 2. *Allibrotus*, Edw.; G. 3. "Leptochirus," Zaddach; G. 4. *Iphimedia*, Rathke, D. "Epimeræ magnæ, 4tæ maximæ, 5tis multo brevioribus et vix bilobatis. Styli caudales postici ramis duobus oblongis consimilibus apice setigeris et non uncinatis instructi. Antennæ 1mæ sæpius breviores," with a note, "*Dexamine* of Leach, may perhaps be included here," to which he adds that the genus *Hyale* of H. Rathke, contains no characters in its description by this author which do not apply equally well to species of *Iphimedia*; G. 5. *Oediceros*, Kröyer, "*Iphimediæ* affinis;" G. 6. *Amphithoe*, Leach, D. "(includes *Pherusa* of Leach)"; "Epimeræ magnæ, 5tæ maximæ, vix bilobatæ lobo posteriore minimo. Styli caudales postici ramis duobus brevibus dissimilibus instructi, ramo externo apice recurvatim bi-uncinato, interno compresso apice non spinuloso sed pilis parce ciliato. Antennæ 1mæ sæpissime longiores;" G. 7. *Gammarus*, Fabr. D., with notes upon *Amathia*, Rathke, and *Eusirus*, Kröyer; G. 8. *Photis*, Kröyer; G. 9. *Melita*, Leach, D. "Epimeræ 5tæ 4tis multo breviores (sic an semper?). Styli caudales uno ramo longo, sive subcylindrico sive foliaceo, altero brevi vel obsoleto. [Digitus in manus latus sæpe claudens]. Antennæ 1mæ sæpius longiores." To *Photis* and *Melita* he assigns "*Antennæ 1mæ non appendiculatæ*," and then under "antennæ 1mæ appendiculatæ," he places G. 10. *Mæra*, Leach, D.—"Epimeræ et styli caudales postici ac in *Melitâ*." Under the heading "*Styli caudales postici simplicissimi, ramo uno brevi et nudo, apice paulo reflexo et spinas duas perbreves paulo exsertas gerente*," he places G. 11. *Dercothoe*, Dana.—"Epimeræ mediocres, 5tæ bene bilobatæ, 4tis sæpius vix breviores. Pedes 1mi 2dique digito uni-articulato confecti"; G. 12. *Pyctilus*, Dana (*Erichthonius*, Edw.?)—"Epimeræ mediocres vel breves corpore lineari, subdepresso. Antennæ longæ, flagellis sat longis. Manus 1mæ articulis 4to 5toque sæpe instructæ, digito uni-articulato: 2dæ digito 2-articulato;" G. 13. "(An hujus sedis?) *Pardalisca*, Kröyer. He then gives in a separate section, G. 14. *Atylus*, Leach; G. 15. *Ischyrocerus*, Kröyer.

The second main division of the Gammaridæ has "Pedes 10 postici partim prehensiles." Subfam. 5. Pontoporinæ. G. 1. *Lepidactylis*, Say; G. 2. *Pontiporeia*, Kr.; G. 3. *Ampelisca*, Kr.; G. 4. *Protomedeia*, Kr.; G. 5. *Aora*, Kr.; G. 6. *Phoxus*, Kr. Subfam. 6. Isæinæ. G. 1. *Isæa*, Edw.; G. 2. *Anisopus*, Templeton. He doubts whether *Laphystius*, Kröyer, belongs to the *Isæinæ* or *Corophidæ*.

Of "Subtribus III. Hyperidea," he says, "In the first family of the Hyperidea, (the *Hyperidæ*), neither of the 5 posterior pairs of legs are subchelate, and the antennæ are not folded up beneath the head or thorax. In the second (the *Phronimidæ*), one or more of the 3 posterior pairs of legs are subchelate or much enlarged, apparently for grasping in coition, and the antennæ are as in the Hyperidæ. The third family (*the Typhidæ*), differs from both the preceding in the concealment and folding of the inferior antennæ beneath the head or thorax, and in many of the species, the abdomen closes up against the venter."

The Hyperidea he arranges thus:—Fam. 1. Hyperidæ. "Antennæ 2dæ exsertæ. Abdomen in ventrem se non flectens. Pedes 5ti 6ti 7mique formâ longitudineque mediocres, 5tis 6tisque non percrassis nec prehensilibus." Subfam. 1. Vibilinæ. G. 1. *Vibilia*, Edw. Subfam. 2. Hyperinæ. G. 1. *Lestrigonus*, Edw.; G. 2. *Tyro*, Edw.; G. 3. *Hyperia*, Latr.; G. 4. *Metoecus*, Kröyer; G. 5. *Tauria*, Dana, "Antennæ ac in *Hyperiâ*. Pedes 2di non prehensiles, articulo 4to apice inferiore non expanso nec producto"; G. 6. *Daira*.

Edw.; G. 7. *Cystisoma*, Guérin. Subfam. 2 [3]. Synopinæ.—"Corpus gracilius. Palpus mandibularis sat brevis, latissimus. Oculi grandes." G. 1. *Synopia*, Dana.—"Caput subtriangulatum, non oblongum. Pigmentum oculorum unicum. Pedes 1mi parvuli, prehensiles; 2di setis longiusculis confecti; 4ti subprehensiles; 5ti 6ti 7mique subæqui."

Fam. II. Phronimidæ. "Antennæ 2dæ exsertæ. Abdomen in ventrem se non flectens. Pedes 5ti 6tive sive crassi sive elongati, sæpius prehensiles, quoque 3tii 4tique sæpe prehensiles." Subfam. 1. Phroniminæ. G. 1. *Phronima*, Latr.; G. 2. *Primno*, Guérin. Subfam. 2. Phrosininæ. G. 1. *Anchylomera*, Edw. (*Hieraconyx*, Guérin); G. 2. *Phrosina*, Risso (*Dactylocera*, Latreille); G. 3. *Themisto*, Guérin. Subfam. 3. Phorcinæ. G. 1. *Phorcus*, Edw.

Fam. III. Typhidæ. "Antennæ 2dæ sub capite thoraceve celatæ et sæpius replicatæ. Abdomen in ventrem sæpe se flectens. Pedes 6 postici interdum abbreviati, articulo 1mo operculiformi, interdum longitudine mediocres." Subfam. 1. Typhinæ.—"Abdomen in ventrem se flectens." G. 1. *Dithyrus*, Dana,—"Pedes 5ti 6tique articulo 1mo latè lamellati, articulis reliquis omnino obsoletis. Antennæ 2dæ breves, sub capite celatæ, non replicatæ, articulo 1mo longiore quam 2dus." G. 2. *Typhis*, Risso.—"Pedes 5ti 6tique articulo 1mo late lamellati, articulis reliquis paulo abbreviatis. Antennæ 2dæ biplicatæ, articulo 1mo longiore quam 2dus." G. 3. *Thyropus*, Dana, "(Species *Typhis ferox* (Edw.) is here included),"—"Pedes 5ti 6tique articulo 1mo latè lamellati, articulis reliquis paulo abbreviatis. Antennæ 2dæ 4-5-plicatæ, sub thoraeis latere celatæ, articulo 1mo multo breviore quam 2dus." Subfam. 2. Pronoinæ.—"Abdomen in ventrem se non flectens. Caput non oblongum, antennis frontalibus." G. 1. *Pronoe*, Guérin.—"Pedes 2di non prehensiles. Pedum 6 posticorum articuli 1mi lati, reliquâ parte paris 7mi fere obsoletâ." G. 2. *Lycæa*, Dana.—"Pedes 1mi 2dique subchelati. Articuli pedum 6 posticorum 1mi angusti, subæqui, reliquâ parte paris 7mi paulo abbreviatâ." Subfam. 3. Oxycephalinæ. "Abdomen in ventrem se non flectens. Caput oblongum, antennis 1mis superficiem capitis inferiorem insitis." G. 1. *Oxycephalus*, Edw.; G. 2. *Rhabdosoma*, White.

1852. Dana, James Dwight.

United States Exploring Expedition, during the years 1838, 1839, 1840, 1841, 1842, under the command of Charles Wilkes, U.S.N., Vol. XIII. Part II. Philadelphia. 1852. pp. 689—1618. (Whether this Part really appeared before 1853 seems rather doubtful.)

Pages 8–12 of Part I. contain preliminary notes on the classification of the Edriophthalmia. In Part II. the pages referring to Amphipoda are from 691–696, 805–1018, 1440–1443, 1518–1524, 1595–1596.

Taking the Edriophthalmia as Subclass II. of the Crustacea, he makes the Choristopoda, or Tetradecapoda, the first order of this subclass, and thus defines it:—"Cephalothorax multi-annulatus, segmentis thoracis numero septem, pare pedum utroque ad segmentum singulum pertinente, segmento anteriore cephalico brevi. Pedes thoracis pediformes, sæpissime unguiculati. Abdomen paribus appendicum pluribus infra instructum. Appendices branchiales sive thoracici sive abdominales." Of this order he makes three divisions, the Amphipoda, Anisopoda, and Isopoda, rejecting the subdivision of *Læmipoda*, introduced by Latreille. "The Amphipoda," he says, "are uniformly characterized by having—

"1. The three posterior pairs of thoracic legs in one series, and the four anterior pairs in two other series of two pairs each. The branchiæ are thoracic.

"2. The abdominal members in two sets, the three anterior pairs subnatatory, the three posterior styliform."

Of the intermediate Anisopoda, he says, "They have—

"1. *Like Amphipoda*, the three posterior pairs of thoracic legs in one series, and the four anterior in a different series.

"2. *Like Isopoda*, the three posterior pairs of abdominal members are not styliform, only the last having this character."

In discussing the question whether the Amphipoda or Isopoda should rank the higher, he remarks, in favour of the Amphipoda, the position of the branchiæ on the thorax, as thoracic branchiæ characterize all the higher Crustacea. On the other hand, he considers that they show inferiority, by the elongated abdomen, with natatory appendages below, and by the usually long antennæ, both these being Macroural characters. Further, the anterior set of legs includes four pairs, an evidence, he considers, of less concentration of force in the cephalic ganglia; they have a less compact body, are less apt to take to a habitat on dry land, and above all, have often the two "dorsal cords" distinct between the ganglia, while in the Isopods there is but a single cord. This double cord is seen in none of the higher Crustacea.

In Tribe III. the Amphipoda (p. 805), he recognizes two types of structure, one, the Hyperidea, with small, operculiform maxillipeds, large facetted eyes covering most of the large head, the extremity of the abdomen broad and depressed, the natatory abdominal appendages usually oval, lamellar; "in the other type, the outer maxillipeds are elongated and palpiform, the eyes are small, the head of moderate size, the abdomen, when not obsolete, narrow, and the natatory abdominal appendages usually slender. This second type comprises two groups. In one section, the Caprellidea, the abdomen is obsolescent. In the other, the Gammaridea, the abdomen is fully developed, with three pairs of natatory appendages, and as many of stylets." This section embraces the typical Amphipods, the Gammari, Talitri, and the like.

His three subtribes, Caprellidea, Gammaridea, and Hyperidea, he divides and subdivides into families and subfamilies, which are defined as follows :—

Subtribe I. Caprellidea. Family I. Caprellidæ.—Corpus anguste elongatum, fere filiforme. Antennæ 2dæ longitudine mediocres. [Species non parasiticæ.]

Fam. II. Cyamidæ.—Corpus late depressum. Antennæ 2dæ rudimentariæ. [Species parasiticæ].

Subtribe II. Gammaridea. Fam. I. Dulichidæ.—Habitu Caprelloideæ. Corpus lineare, epimeris obsoletis. Pedes 6 postici longi, subprehensiles. Abdomen 5-articulatum.

Fam. II. Chelluridæ.—Corpus fere cylindricum, epimeris mediocribus. Abdomen abnormale, segmentis 4to 5toque coalitis et oblongis, stylis inter se valde dissimilibus.

Fam. III. Corophidæ.—Gressoriæ, pedibus partim lateraliter porrectis. Corpus plus minusve depressum, sive latum sive lineare, epimeris perbrevibus, interdum obsoletis. Abdomen formâ appendicibusque normale. Antennæ saepe pediformes.

Fam. IV. Orchestidæ.—Saltatoriæ, pedibus nullis lateraliter porrectis. Corpus compressum, epimeris magnis. Abdomen appendicibus normale. Antennæ non bene pediformes. Styli caudales 1mi 2diique biramei; 3tii simplices, brevissimi et ultra 2dos non prolongati. Mandibulæ non palpigeræ. Maxillæ 1mæ palpo sive parvulo et 1-articulato sive obsoleto instructæ.

Fam. V. Gammaridæ.—Saltatoriæ vel natatoriæ, pedibus nullis lateraliter porrectis. Corpus sæpius compressum, raro subdepressum, epimeris sive magnis sive parvis. Styli caudales laxiores, duobus altimis oblongis sæpiusque ultra 2dos prolongatis, raro simplicibus. Mandibulæ sæpissime palpigeræ. Maxillæ 1mæ palpo 2–3-articulato (rarissime 1-articulato) instructæ.

Subtribe III. Hyperidea. Fam. I. Hyperidæ.—Antennæ 2dæ exsertæ. Abdomen in ventrem se non flectens. Pedes 5ti 6tique 7miique formâ longitudineque mediocres, 5tis 6tisque non pererassis nec prehensilibus.

Fam. II. Phronimidæ.—Antennæ 2dæ exsertæ. Abdomen in ventrem se non flectens. Pedes 5ti 6tique sive crassi sive elongati, sæpius prehensiles, quoque 3tii 4tique sæpe prehensiles.

Fam. III. Typhidæ.—Antennæ 2dæ sub capite thoraceque celatæ et sæpius replicatæ. Abdomen in ventrem sæpe se flectens. Pedes 6 postici interdum abbreviati, articulo 1mo operculiformi, interdum longitudine mediocres.

The family Caprellidæ is not subdivided by Dana into subfamilies, but he distinguishes three sets of genera in the following manner; 1. *Pedes thoracis numero* 14, containing the genera *Proto*, Leach, and *Protella*, Dana. 2. *Pedes thoracis 3tii 4tique omnino obsoleti*, containing *Caprella*, Lamarck, *Ægina*, Kröyer, *Cercops*, Kröyer. 3. *Pedes 3tii 4ti 5tique obsoleti*, with the single genus *Podalirius*, Kröyer.

The family Cyamidæ contains but a single genus. So also in the Gammaridea, the families Dulichidæ and Chelurida have but one genus apiece.

The family Corophidæ is subdivided into three subfamilies.

1. Clydoninæ.—Styli caudales:—1mi 2dique slices, subulati.
2. Corophinæ.—Antennæ plus minusve pediformes. Styli caudales 1mi 2dique biramei.
3. Icilinæ.—Antennæ non pediformes nec subpediformes, flagellis sat longis basique sat brevi instructæ. Styli caudales ac in Corophinis.

The family Orchestidæ contains the genus *Orchestia* with three subgenera, *Talitrus*, *Talorchestia*, and *Orchestia*, and the genus *Allorchestes*, but no subfamilies.

The family Gammaridæ contains the following subfamilies:—

1. Stegocephalinæ.—Antennæ breves, superiores basi crassæ. Mandibulæ acie denticulatâ instructæ, palpo brevi, uniarticulato, intus dentato. Epimeræ permagnæ.
2. Lysianassinæ.—Antennæ breves, superiores basi crassæ. Mandibulæ apice parce dentatæ et cuspidatæ, acie vix instructæ, palpo 2–3-articulato. Maxillipedes lamellis internis grandibus. Epimeræ permagnæ.
3. Leucothoinæ.—Antennæ superiores basi plus minusve graciles. Maxillipedes elongati, angusti, articulo longo unguiformi confecti, *lamellis internis perbrevibus*. Mandibulæ sive palpigeræ sive non palpigeræ, processu molari carentes. [An semper?]. Epimeræ magnæ.
4. Gammarinæ.—Antennæ 1mæ basi graciles. Maxillipedes sat lati, lamellis internis sat elongatis. Mandibulæ acie denticulatâ instructæ et alterâ accessoriâ quoque processu molari et palpo 3-articulato. Pedes 10 postici non subprehensiles.
5. Pontoporeinæ.—Pedes 3tii 4tique plus minusve prehensiles; 6 postici non prehensiles.
6. Isæinæ.—Pedes quatuor vel sex postici subprehensiles.

In the Hyperidea, the family Hyperidæ is subdivided into three subfamilies:—

1. Vibilinæ.—Corpus formâ paulo Gammaroideum. Caput oculique mediocres. Maxillipedes palpo parvulo instructi. Palpus mandibularis tenuis.
2. Hyperinæ.—Caput tumidum. Oculi pergrandes. Palpus mandibularis tennis.
3. Synopinæ.—Corpus gracilius. Palpus mandibularis sat brevis, latissimus. Oculi grandes.

The family Phronimidæ contains three subfamilies:—

1. Phroniminæ.—Abdomen versus basin sat gracile. Pedes 5ti magnâ manu didactylâ vel monodactylâ confecti, 3tii 4ti extremitate graciles, non prehensiles. [Antennæ breves.]
2. Phrosininæ.—Abdomen versus basin sat crassum. Pedes 5ti prehensiles, monodactyli; quoque 3tii 4tique prehensiles. [Antennæ sat breves.]
3. Phorcinæ.—Pedes 5ti 6tique valde elongati et crassi, sed manu non confecti. [Antennæ breves.]

In regard to the genera into which the subfamilies are distributed many observations are called for. Among the Corophinæ, genus 3, *Platophium*, Dana, has been considered to be the same as genus 4, *Cyrtophium*, Dana, but Haswell under another name revives the distinction. See Note on Haswell, 1885. Genus 7, *Cratophium*, Dana, yields to genus 6, *Podocerus*, Leach. Genus 9, *Cerapodina*, Edw., belongs to genus 8, *Crapus*, Say. *Pleppocera*,

Latreille, the second genus of the Icilinæ, is the same as *Lepidactylis*, Say, which appears later on as genus 1, of the Pontoporeinæ.

The genus *Orchestia* and its three subgenera, *Talitrus*, *Talorchestia*, *Orchestia*, are defined word for word as in the previous paper, the definition of *Talorchestia*, therefore, still being, "Pedes 1mi *maris* ac in *Talitro*, feminæ manu parvulâ instructi," but, to agree with Dana's other statements, and with the facts of the case, the definition of *Talorchestia* should evidently read:—Pedes 1mi *feminæ* ac in Talitro, *maris* manu parvulâ instructi. It is probably owing to this misprint that the British Museum Catalogue speaks of the males of this subgenus as *Talitri* and the females as *Orchestiæ*. The three subgenera have since been generally accepted as genera. The whole subject is somewhat involved. The genus *Talitrus*, Latreille, at its first appearance in Bosc. vol. i. p. 78, is thus defined:—"Quatre antennes simples; les intermédiaires supérieures, et plus courtes que le pédoncule des latérales et intérieures; dix à quatorze pattes."

"Exemple du genre. *Gammarus locusta*, Fab.—*Oniscus gammarellus*, Pallas."

In vol. ii. p. 148, a fuller definition is given:—"Quatre antennes simples; les intermédiaires, supérieures, plus courtes que le pédoncule des inférieures. Corps alongé, couvert de piéces crustacées, transverses, presque égales, et appendiculées sur leur côtés. Dix à quatorze pattes; les antérieures terminées par des mains. Des appendices bifides a l'extrémité du corps."

In 1813, Leach carved a new genus out of *Talitrus*, giving for *Talitrus* the character "Pedes quatuor antici in utroque sexu subæquales monodactyli;" for the new genus *Orchestia*, "Pedum paria quatuor antica monodactyla, pari secundo manu compressa magna, fœminæ pari antico monodactylo secundo didactylo." Thus the original definition of *Talitrus* is set at naught, and those members of the group which have "the anterior feet terminated by hands" are assigned to *Orchestia*. Milne-Edwards distinguishes the two genera only by the second gnathopods, with a large subcheliform hand in *Orchestia*, non-prehensile in *Talitrus*. He takes no notice of the distinction of sex in *Orchestia* to which Leach refers.

In 1848 Friedrich Müller called attention to the fact that the females have sometimes the characters of one genus, while the males have those of another, the females in certain *Orchestiæ* being true *Talitri*. In Dana's words and according to Dana's definitions, "in one group, the individuals of both sexes are Orchestiæ; in another, the males are Orchestiæ and the females Talitri; in a third, both sexes are *Talitri*.

A further complication is introduced into the group by the genus *Orchestoidea*, Nicolet, or *Talitronus*, Dana. In this it appears that the females are *Talitri*, while the males are *Talitri* in the first gnathopod and *Orchestiæ* in the second. The genus comes therefore nearer to *Talorchestia* than to *Orchestia*. Dana's generic name was, according to Dana, published in the same year with Nicolet's, but may yield precedence, since Dana rejected his own genus, and, so far as I can make out, dates the publication from the time when his paper was *read*, rather than from the time when it was technically *published*. On p. 1595, among the addenda et corrigenda, he says:—"*Orchestoidea tuberculata* of Nicolet, (loc. cit., Pl. II. f. 4) is the author's Talitronus insculptus, and the genus Talitronus was instituted and published by the author on July 1, 1849. The name has been since rejected by him for Orchestia insculpta; and as Gay's specific name is the older, it will become *Orchestia tuberculata*. We suspect that his Talitrus Chilensis is what we have considered the female of the O. insculpta." *Megalorchestia*, Brandt, 1851, is an additional synonym.

The second genus which Dana assigns to the Orchestidæ, is clearly distinguished from his first genus, *Orchestia*, in the following manner:—"Allorchestes;—Maxillipedes unguiculati. Antennæ 1mæ minores, basi inferiorum sæpissime longiores. Epimeræ 5tæ 4tis sæpius multo breviores."

Further on, p. 883, he adds to the generic description, "Feet of first and second pairs subchelate.

Posterior stylets very short and quite simple, as in *Orchestia*." He also observes that in some species the carpus of the second pair of legs in males is "produced downwards back of the hand, between the hand and the anterior extremity of the third joint (while in Orchestia, the third joint is never separated from the hand by a portion of the carpus, and the carpus is always short, transverse, and is situated wholly above the third joint)."

But while *Allorchestes* is with sufficient clearness distinguished from *Orchestia*, its own position is otherwise involved in some obscurity.

On page 1595, among the addenda et corrigenda, Dana remarks, "The genus *Nicea* of Nicolet (loc. cit.) may possibly be the same with Allorchestes; but the essential characteristics are not given, excepting the non-palpigerous character of the mandible. Even if identical, the genus does not antedate the author's, as the description of Allorchestes was first published on July 1st of 1849. The maxillipeds are peculiar in having the surface tuberculate, and the inner lamella is dentate only at apex, and there sparingly."

Neither Dana, in describing *Allorchestes*, nor Nicolet, in describing *Nicea*, mentions the form of the telson. Hence, in Mr. Faxon's opinion, the names were synonyms, and he agrees with Spence Bate and Heller in allotting the name *Allorchestes* to the species which have the telson entire, and the name *Nicea* to those in which the telson is divided. As shown in the note on Rathke, 1837, I myself consider it right to assign the name *Hyale* to the latter, and *Hyalella* to the former.

In passing on to the Gammaridæ, it should be noticed that, in defining the subfamily Stegocephalinæ, Dana follows Krøyer in erroneously assigning a palp to the mandibles. The genus *Urisles* which he places among the Lysianassinæ is evidently based on misconception, as Spence Bate has acutely pointed out. The description in Dana evidently corresponds with the figure, and of this Spence Bate observes (B. M. Catalogue, p. 89, note), "In the figure, Dana has drawn one of the first pair of pereiopoda instead of the second pair of gnathopoda. The meros *always* overrides the carpus in the pereiopoda, and underrides it in the gnathopoda." Dana places *Alibrotus*, Milne-Edwards, among the Gammarinæ, but it more probably belongs to the Lysianassinæ. He separates *Mæra*, Leach, from *Melita*, Leach, on the ground that the former has the first antennæ appendiculate and the latter not so, whereas in both genera the upper antennæ have an accessory flagellum. His three species of *Mæra* have been transferred by Spence Bate to *Melita*, and his *Melita tenuicornis* to *Mæra*, though with the notice that if the original description of this species, assigning no secondary appendage to the upper antennæ, is to be relied on, a new genus must be formed for its reception, along with *Melita Fresnelii*, Savigny-Audouin. Axel Boeck rests the discrimination of the two genera apparently only on these two points, that in *Melita* the third joint of the mandibular-palp is elongate, and the inner branch of the third uropods very small, while in *Mæra* the third joint of the mandibular palp is not very long, and the inner branch of the third uropods is nearly as long as the outer.

The genera *Dercothoë*, Dana, and *Pyctilus*, Dana, are by S. I. Smith made synonyms of *Eurythonius*, Milne-Edwards. *Anisopus*, Templeton, which Dana places in his subfamily, Isæinæ, is doubtless identical with the later genus, *Synamphitoë*, but the name *Anisopus* was preoccupied. In his notes Dana observes that *Glaucomone* of Krøyer has the hands and antennæ, and apparently the other characters of *Uncicola*, Say; to that genus it has in fact since been united by S. I. Smith. He also remarks that *Bellia* of C. Spence Bate (afterwards named *Sulcator*) falls to *Lepidactylis*, Say.

Among the Hyperidæ, the genus *Lestrigonus*, M.-Edw., is now generally considered to belong to *Hyperia*, Latr., though Streets keeps it distinct. Dana gives two genera, distinguished from one another and from *Hyperia* by differences in the gnathopods, viz., *Metoecus*, Krøyer, and *Tauria*, Dana. These two Boeck unites as completely synonymous under the name *Tauria*, *Metoecus*, though the older, being preoccupied; but Bovallius, 1886, considers

Tauria, Dana, distinct alike from *Hyperia*, with which Spence Bate united it, and from *Metoecus*, with which Boeck made it synonymous. *Daira*, Milne-Edwards, is altered by Dana, on page 1596, to *Dairilia*, on the ground that *Daira* was preoccupied. This new form of the name is incorrectly given as *Dairinia* in the British Museum Catalogue, owing probably to the misprint in Dana's own work, on page 1442. It is given correctly on pages 1519, and 1545 and 1604; Bovallius, 1885, says, "I am quite sure that Dana was wrong in introducing the animals described by him into the genus Daira of Milne-Edwards;" he is of opinion that *Paraphronima*, Claus, comes nearest to, if it be not identical with, the *Daira* of Milne-Edwards. *Synopia*, Dana, the single genus of his subfamily Synopinæ, must be transferred to the Gammaridea, as Claus has already pointed out. In some of the species of this genus, besides the confluent principal eyes to which the generic name refers, there are two small subsidiary groups of ocelli; hence the expression "pigmentum oculorum unicum" in the generic character is unsuitable.

For the readjustment of the other two families of the Hyperidea see Notes on Claus, 1879.

In treating of the Orchestidæ, which he takes as the type of the Amphipoda (p. 849), Dana describes in detail the head and its (theoretical) segments. He considers that the sides and top of the head correspond to the first antennary and ophthalmic annuli, one or both; that the epistome and lateral plates adjoining it represent the sternal and episternal pieces of the second antennary annulus [against which view see Spence Bate, British Assoc. Report, 1885, p. 26]; that the labrum and a lateral piece above the mandible represent the sternal and episternal pieces of the mandibular annulus; that the back piece of the lower part of the head which supports the maxillipeds is the proper episternal of the maxilliped annulus, while the first and second maxillary annuli are not represented, unless combined with the maxilliped segment at the back of the head.

Pages 1395–1413 contain an interesting essay on the classification of Crustacea. "The fundamental idea," the author says, "which we shall find at the basis of the various distinctions of structure among the species is, the *higher centralization of the superior grades, and the less concentrated central forces of the inferior.*" "This centralization is literally a *cephalization* of the forces. In the higher groups, the larger part of the whole structure is centred in the head, and contributes to head functions, that is, the functions of the senses and those of the mouth. As we descend, the head loses one part after another, and with every loss of this kind there is a step down in rank. This centralization may be looked for in the nervous cords; but the facts are less intelligibly studied there than in the members, the production and position of which measure the condition of the forces." At the close he criticises the names Podophthalmia and Edriophthalmia, on the ground that though all stalk-eyed Crustacea may belong to the Podophthalmia, there are many sessile-eyed species which cannot be grouped with the Edriophthalmia. In the classification which follows, pages 1414–1415, he renames his Subclass II., Tetradecapoda, which he thus defines:—"Annuli cephalothoracis cephalici numero *septem*. Oculi sessiles. Appendices branchiales simplicissimæ, sive thoracicæ sive abdominales. Cephalothorax multi-annulatus, carapace carens, pedibus seriatis instructus. Abdomen appendicibus seriatis instructum, raro obsolescens." The epithet *simplicissimæ* applied to the branchial appendages must be qualified in regard to some species of Amphipoda.

The work concludes with an essay on the Geographical Distribution of Crustacea, pages 1451–1592, in which many interesting conclusions are deduced from the facts at Dana's command. When he comes to speak (p. 1581) of the "origin of the geographical distribution of Crustacea," he says, for the origin of the existing distribution of species "two great causes are admitted by all, and the important question is, how far the influence of each extended. The first, is *original local creations*; the second, *migration*." The form of his answer to this question would probably have been different had his book been

written ten or twenty years later, but he fully admits that migration "is an actual fact in nature, interfering much with the simplicity which zoological life in its diffusion would otherwise present to us."

The new species, published either in this work or in the two preceding papers also dated 1852, are as follows:—in Subtribe I. Caprellidea. Fam. 1. Caprellidæ; *Proto elongatus*, identified by Mayer with *Proto ventricosa*, O. F. Müller; *Protella gracilis*, the only addition to the variously-worded definition of Protella being, "pedes sex ultimi subæqui"; *Caprella robusta*, according to Mayer the young of *Caprella acutifrons*, Latr.; *Caprella cornuta*, with a variety named *obtusirostris*; *Caprella attenuata*, which Mayer thinks may be the same as *Caprella scaura*, Templeton; of this a variety is named *subtenuis*; *Caprella globiceps*, which he thinks may be a variety of *Caprella dilatata*, Kröyer; the last-named species, which Dana figures and describes, is held by Mayer to be synonymous with *Caprella acutifrons*, Latr.; *Caprella januarii*, Kröyer, which Dana figures and describes, is referred by Mayer to *Caprella æquilibra*, Say; Dana himself suggests that the animal which he figures as the female may be a distinct species, for which in that case he proposes the name *Caprella humilis*; after *Caprella globiceps* he describes *Ægina ? tenella* and *Ægina ? aculeata*, suggesting that the latter may be the female of the former.

Subtribe II. Gammaridea. Fam. III. Corophidæ. Subfam. 1. Clydoninæ. *Clydonia gracilis*; *Clydonia longipes*, which with the preceding species should, according to Bovallius, be transferred to the genus *Tyro*, M.-Edw., among the Hyperidea: Subfam. 2. Corophinæ. *Corophium? quadriceps*, a species, as Dana himself intimates, of doubtful position, and probably immature, since the length is given as "nearly one line;" *Platophium brasiliense*; *Cyrtophium orientale*; *Cratophium validum*, named by Sp. Bate, in the Brit. Mus. Catal., *Podocerus validus*; his *Gammarus orientalis* he here calls *Cratophium orientale*, and Sp. Bate, in the B. M. C. renames it *Podocerus orientalis*. Subfam. 3. Icilinæ. *Icilius elliptieus*, which had been originally named *Icilius oralis*.

Fam. IV. Orchestidæ. *Orchestia* (*Talitrus?*) *novi-zealandiæ*, with the suggestion, since proved correct, by G. M. Thomson, that it may be the female of *Talorchestia quoyana*, M.-Edw.; *Talitrus brevicornis*, M. Edw., which he next describes, is, he says, "near the *novi-zealandiæ*;" according to the B. M. C. "Dana likewise considers it a true *Talitrus*, unless it should be the female of *Talorchestia Quoyana*," but I do not find this alternative in Dana's own work; his next species *Orchestia* (*Talitrus*) *inseulpta* had been originally published as *Talitronus inseulptus* for the male and *Talitrus ornatus* for the female; in the addenda he calls it *Orchestia tuberculata*, Nicolet, for which the Brit. Mus. Catal. restores Nicolet's name *Orchestoidea tuberculata*; *Orchestia* (*Talitrus*) *brasiliensis* is named *Orchestoidea brasiliensis* in the B. M. C.; *Orchestia* (*Talitrus*) *pugettensis* is named *Orchestoidea pugettensis* in the B. M. C., but as only the female of this species is described, and the Catalogue states that in *Orchestoidea* "the female is a true *Talitrus*," it is difficult to see how the determination is arrived at; *Orchestia* (*Talitrus ?*) *scabripes* is transferred to *Orchestoidea* in the B. M. C.; *Orchestia* (*Talorchestia*) *gracilis*, of which the female had been already published by Dana as *Talitrus gracilis*, is now *Talorchestia gracilis*, having in the male "feet of first pair with a small, narrow hand," p. 862; *Orchestia* (*Talorchestia ?*) *quoyana*, Milne-Edwards, is now accepted as without doubt a *Talorchestia*; in the subgenus *Orchestia* he places *Orchestia scutigerula*, comparing it with *Orchestia chilensis*, M.-Edw.; *Orchestia capensis*; *Orchestia chilensis?*, Milne-Edwards, the female only, which is accepted in the B. M. C. without a ?; *Orchestia nitida*; *Orchestia serrulata*; *Orchestia tenuis*; *Orchestia sylvicola*, a species which G. M. Thomson, 1880, unites with *Orchestia novæ-zealandiæ*, Sp. Bate, and *Orchestia tenuis*, Dana, describing it as "a strictly terrestrial form, always occurring among dank vegetation, bush soil, etc., and drowning very rapidly in water; extremely common;" Mr. Thomson says, "it is singular that Prof. Dana should have

described the male only of *O. sylvicola*, for it has been frequently noticed, both by Professor Hutton and myself, that males are extremely rare," but in fact, though the B. M. C. only describes the male, Dana's description is of the female, and the male form of uncertain habitat, of which he appends a description, is left doubtful between *Orchestia sylvicola* and *Orchestia tenuis*; *Orchestia spinipalma*; *Orchestia tahitensis*, taken "at fifteen hundred feet elevation, on the Island of Tahiti, several miles from the sea," must be transferred back to the name *Orchestia rectimana* under which it was originally published; *Orchestia dispar*. *Orchestia quadrimana*; *Orchestia hawaiensis*; *Orchestia pickeringii*. To the genus *Allorchestes* thirteen species are assigned, of which (with one exception) the true generic position remains uncertain, as no information is given as to the telson; the specific names are "1. *Gaimardii?* (Edw.), D.," in place of *compressa*, Dana, the doubtful correction being accepted as certain in the B. M. C.; Dana says, "the description by Edwards agrees with our specimens in most points, though differing in making the posterior stylets end in two rudimentary branches, instead of one," a critical point on which the B. M. C. gives no information; 2. *verticillata*, to which *Allorchestes peruviana*, Dana, is referred as "female of *A. verticillata?*," the suggestion being here made that Kroyer's *Orchestia gracilicornis* from Valparaiso is an *Allorchestes* near to *verticillata*; 3. *hirtipalma*; 4. *gracilis*; 5. *humilis*, "female!;" 6. *australis*; 7. *brevicornis*; 8. *novi-zealandiæ*, the male of which had been originally described as a separate species under the name *intrepida*; 9. *orientalis*; 10. *Allorchestes* (?) *graminea*, called *Allorchestes gramineus* in the B. M. C., which omits the important observation made by Dana, "the reniform eye of this species leads me to doubt the correctness of arranging it with the *Allorchestes*, and as I made no dissection, I am not sure that its mandible has no palpus, or that its posterior stylets are simple;" 11. *media*, changed into *medius* in the B. M. C.; 12. "*Hawaiensis*;" 13. "*Pugettensis*." Since Mr. Faxon has ascertained that in *Allorchestes media* the telson is cleft, this species should, according to Mr. Faxon's view, be called *Nicea media*, but, according to my view, *Hyale media*.

In Fam. V. Gammaridæ, Subfam. 2. Lysianassinæ, begins with the species "*Lysianassa? Brasiliensis*," which from the character of the lower antennæ is no doubt described from a male specimen, but of what genus there is no decisive evidence; the next species *Lysianassa nasuta* is likewise of doubtful genus; *Uristes gigas*, as Spence Bate has pointed out, is founded on a confusion, the first peræopod having been described as the second gnathopod; the species has not yet been assigned to any definite position, which the description of the mandibles "with a pointed dentate apex," the abdomen ending "in an oblong seventh joint" and "the antepenult segment of abdomen acute behind" ought to find for it; "*Anonyx Fuegiensis*," having been originally called *Stenia magellanica*, must receive the name *Anonyx magellanicus*; *Urothoë rostratus* is changed by Boeck into *Phoxus rostratus*, leaving the next species *Urothoë irrostratus*, as the type of the genus. Subfam. 3. Leucothoinæ, contains *Stenothoë validus*. In subfam. 4. Gammarinæ, Dana places *Iphimedia simplex*, in the B. M. C. renamed *Atylus simplex*; *Iphimedia nodosa*, which according to Dana "is allied to the *Acanthosoma hystrix* of Owen;" *Iphimedia fissicauda*, which he had previously called *Amphithoë fissicauda*, and which the B. M. C. renames *Atylus fissicauda*; *Iphimedia capensis*, of which he says, "this species is very near the *Gammarus Othonis*, Edwards, but there is no appendage to the superior antennæ," and which in the B. M. C. is called *Atylus capensis*; *Iphimedia pugettensis*, which the B. M. C. sets in a new genus *Grayia*, with only one other species, called *Grayia imbricata*, this latter being probably the young of *Amathilla homari*, Fabr.; Dana's *Iphimedia pugettensis* should in my opinion be called *Pleustes pugettensis*; *Œdicerus novi-zealandiæ*, in the B. M. C. called *Œdicerus novæ-zealandiæ*, with the appended remark that, "*Grayia Pugettensis* may belong to this genus (certainly not to *Iphimedia*)"; the name is again altered by Thomson and Chilton into *Œdicerus neo-zelanicus*; to *Amphithoë* Dana assigns seven species, *rubella*, *orientalis*,

tenuipes, *peregrina*, *brevipes*, *brasiliensis*, *filicornis*, names hitherto unimpeached, except that, in regard to *brasiliensis*, the B. M. C. observes that "the description of this species closely resembles that of *A. Gaudichaudii* of Edwards, the chief distinction being the length of the flagellum of the inferior antennæ," but a more important distinction is that in Milne-Edwards' species the first joint of the first and second peræopods is "*ovalaire* (au lieu d'être presque linéaire comme d'ordinaire);" of the species assigned by Dana to *Gammarus*, Spence Bate leaves only one in that genus; *Gammarus asper* is called in the B. M. C. *Megamœra aspera*; *Gammarus sulcensis*, as to which Dana says "[*An femina* G. asperi ?]," is called in the B. M. C. "*Megamœra Sulcensis*," but seeing that the mandibular palp has the second joint much shorter than the first, it probably belongs to a distinct genus, perhaps including *Gammarus asper*, since Dana says of these two, "they are alike in the very slender mandibular palpi without a ciliated arrangement of hairs on the apical joint"; *Gammarus albidus* in the B. M. C. becomes *Megamœra albida*: *Gammarus tenuis* is called *Microdentopus tenuis* in the B. M. C., with the remark appended that "this species closely resembles *M. anomalus* of the British coast;" *Gammarus furcicornis*, in the B. M. C. *Mœra furcicornis*: *Gammarus tenellus* in the B. M. C. *Mœra tenella*: *Gammarus fuegiensis*, of which Dana makes, and, as it were, in the same breath retracts, the suggestion that it may "be the female of the *G. tenellus*," is called in the B. M. C. "*Mœra Fuegiensis*": *Gammarus quadrimanus*, in the B. M. C. *Mœra quadrimanus*: *Gammarus brasiliensis* called "*Gammarella Brasiliensis*" in the B. M. C., although contrary to the definition of the genus *Gammarella* the upper antennæ are twice as long as the lower, and the third uropods are evidently regarded as biramous; *Gammarus pugettensis* the B. M. C. leaves unaltered. Between the last and the following species Dana places a heading, "appendix to the genus Gammarus." This section begins with *Gammarus? peruvianus*, called in the B. M. C. "*Megamœra Peruviensis*:" this species was originally called by Dana *Amphithoë peruviana*, and is here said to be "near the *G. brasiliensis* in many characters;" *Gammarus? pubescens*, previously called *Amphithoë pubescens*, is named in the B. M. C. *Gammarella pubescens*, but it is difficult to see on what grounds, since the upper antennæ are "almost twice as long as the other pair," and the third uropods are not described; *Gammarus? indicus* in the B. M. C. is named "*Megamœra Indica*:" *Melita tenuicornis*, doubtfully including what was originally *Amphithoë tenuicornis*, male, and *Amphithoë* (*Melita*) *inæquistylis*, female, is given in the B. M. C. as *Mœra tenuicornis*, though with some doubt as to the genus, because the species is described "as having no secondary appendage to the superior antennæ;" *Mœra valida* in the B. M. C. is named *Melita valida*: *Mœra setipes*, in the B. M. C. *Melita setipes*, is distinguished by the most trivial characters in the description from the following species *Mœra anisochir*, of which the synonyms given are *Gammarus anisochir*, Kroyer, and *G.* (*Mœra*) *pilosus*, Dana, this becoming in the B. M. C. *Melita anisochir*: Dana's figures, however, of the two species *setipes* and *anisochir* suggest the possibility of more considerable differences than those which he mentions in the text. A fuller definition than in the previous paper is then given of the new genus *Dercothoë*.

"*Epimeræ mediocres, 5tae subæquè bilobatæ, 4tis vix breviores. Margo frontis lateralis juxta oculos sæpe valde sulcus. Styli caudales postici simplicissimi, sat longi, ramo brevi, subconico, apice paulo reflexo e quo spinis duabus brevissimis exsertis. Antennæ superiores sæpius longiores, appendiculatæ.*" He adds, "the posterior stylets are like those of Pyctilus, and unlike those of any of the preceding genera. The carpus in the legs of the first pair is often as long as the head, and sometimes longer. The two very short spines at the apex of the posterior stylets are full half as broad as long."

The new genus *Pyctilus* is more fully defined as follows:

"*Epimeræ sat breves. Pedes 1mi 2dique prehensiles, reliqui non prehensiles, secundarum digito 2-articulato, manu 1-articulati. Antennæ elongatæ, secundæ subtus primas ciliatæ. Styli*

caudales postici ac in Dercothoe." He adds, "the genus is near *Erichthonius* (Edwards), if not identical with it. The stress which is laid by Milne-Edwards on the rudimentary character of the epimerals of the anterior thoracic segments, and his reference of his species to the Corophidæ or gressorial Amphipods, leads us to doubt the identity. The posterior stylets have the same form as in *Dercothoe*, and the form of the head, the projecting eyes, and general habit, are nearly as in that genus. The approximation is so close, that the genera are evidently of one and the same group; we have no evidence in the antennæ, caudal stylets, or legs, that the species in every case are gressorial. The antennæ are slender, with long flagella. The epimerals are broader than in some Gammari. The caudal stylets are rather long." He also says that "a female Pyctilus, bearing eggs, has been observed by the author, which has the same form of hands as is characteristic of the group Erichthonius," and that "in this genus as well as the preceding, the first joint of the legs of the fifth and sixth pairs is very broad, while that of the seventh is narrow."

Spence Bate makes *Erichthonius* and *Pyctilus*, and inclines to make *Dercothoë*, synonymous with *Cerapus*, Say. Boeck puts them all three under that genus, which S. I. Smith has shown to be distinct from them all. S. I. Smith unites *Dercothoë* and *Pyctilus* as synonyms of *Erichthonius*, but still without noticing the breadth of the side-plates in (some at least of) Dana's species, which, as Dana himself observes, makes the identification with *Erichthonius* doubtful. In the work of Bate and Westwood, vol. i. p. 453, Dana is supposed to have "founded his genus *Pyctilus* upon a misconception of the figure of *Erichthonius difformis*," but Dana clearly alludes not to the mistake in the figure, but to the express words of the generic account, "l'état rudimentaire des pièces épimériennes des premiers anneaux du thorax," in the Hist. des Crust., vol. iii. p. 59.

Dana's species are named *Dercothoe emissitius*, previously *Gammarus emissitius; Dercothoe speculans*, previously "*Amphithoe peculans* (by mistake for *speculans*)"; *Dercothoe? hirsuticornis*, previously *Gammarus hirsuticornis; Pyctilus macrodactylus*, previously *Erichthonius? macrodactylus; Pyctilus pugnax*, previously *Erichthonius pugnax; Pyctilus brasiliensis.*

In Family 1. Hyperidæ, Subfam. 2. Hyperinæ, contains *Lestrigonus ferus; Lestrigonus fuscus; Lestrigonus rubescens; Lestrigonus Fabrcii?* Edwards; all which may perhaps belong to the genus *Hyperia;* the genus *Metœus*, Kröyer, ought, Dana thinks, to be merged in *Hyperia*, to which he assigns the species *Hyperia agilis; Hyperia trigona.* The genus *Tauria* is thus defined :—

"*Antennæ quatuor breves, basi approximatæ, 1mæ crassiusculæ. Pedes nulli subcheliformes nec subprehensiles, 7mi vix abbreviati*," with the type-species, *Tauria macrocephala.*

The new genus *Cyllopus* is thus defined :—

"Tauriæ *affinis. Pedes 7mi valde abbreviati. Antennæ 1mæ et 2dæ ad basin inter se remotæ*," with the type-species *Cyllopus magellanicus.*

Daira? debilis, Daira? depressa, Daira inæquipes, are at page 1596 transferred to the generic name *Dairilia* (not *Dairinia*, as in the B. M. C. and elsewhere), *Daira* being preoccupied; but if Bovallius, 1885, is right in assigning Dana's species, not to *Daira*, Milne-Edwards, but to *Thamyris*, Spence Bate, among the Lycæidæ, the name *Dairilia*, Dana, will displace *Thamyris*, by right of priority. The definition given by Dana is as follows :—

"*Antennæ 1mæ non conspicuæ, 2dæ exsertæ. Pedes 1mi 2dique plus minusve prehensiles: tarsi pedum reliquorum breves. Rami stylorum caudalium longi.*" It is placed in the second division of the subfamily, which have "*Antennæ totæ breves. Caput oculique prægrandes.*"

Subfam. 3. Synopinæ, contains the single genus *Synopia*, with the further definition, "*Frons subacutus. Antennæ 4 longæ, apertæ, 1mæ appendiculatæ. Pedes 2 antici subcheliformes: proximi duo cerripiformes, quatuor sequentes subprehensiles, digito 2-articulato: reliqui mediocres, unguiculati.*" Claus observes that this genus belongs to the *Gammarina*,

and Dana himself notices the resemblances. The species assigned are *Synopia ultramarina*, (with the suggestion that one of the forms figured may be a distinct species to be called *Synopia gracilis*), and *Synopia angustifrons*: in the former he speaks of the eye as single, occupying "the whole breadth of the triangular head," but in the latter species he speaks of "the eyes" in the plural. Bovallius, in 1886, makes the "Amphipoda Synopidea" a separate tribe, in which "the first family, Synopidæ, is the most closely related to the Gammarids."

In Family II. Phronimidæ, Subfam. 1, Phroniminæ, contains only *Phronima atlantica*, Guérin, not figured, the brief notes indicating that *Phronima sedentaria*, Forskål, is in question.

Subfam. 2. Phrosininæ, contains *Anchylomera purpurea*: *Anchylomera thyropoda*, "length, one line; specimen probably not mature"; *Themisto antarctica*.

Subfam. 3. Phorcinæ, contains only *Phorcus hyalocephalus*, on which Dana remarks, "This species has most of the characters mentioned for M.-Edwards' *Phorcus Raynaudii*: but, he observes, that the antennæ are 'un peu renflées vers le milieu'; while, in this species, the basal portion is stout ellipsoidal. Moreover, he states, that the second thoracic ring is very much developed, and the fifth pair of legs is shorter than the sixth."

In Family III. Typhidæ, Subfam. 1. Typhinæ, begins with the genus *Dithyrus*, with the following addition to the definition:—

"Abdomen ad ventrem optimè claudens. Caput transversum, pigmentis non grandibus. Antennæ 2dæ sub capite celatæ, breves, non replicatæ. Pedes 6 postici coxis latissimè clypeati, parte pedum reliquâ obsoletâ. Pedes 4 antici subcheliformes. Abdomen 5-articulatum, segmento ultimo triangulato." In the appended remarks Dana says, "the abdomen, unlike that of *Thyropus*, is shorter than the thorax." This genus is identified by Claus with *Typhis*, Risso, and as *Typhis* is preoccupied, *Dithyrus* (not *Eutyphis*, Claus), takes its place. The species for which Dana instituted the genus is called *Dithyrus fabu*.

The genus *Thyropus* receives the additional definition:—

"*Abdomen ad ventrem claudens. Caput transversum. Pigmenta oculorum non grandia, quatuor. Antennæ 2dæ longæ, sub thoracis latere celatæ, 4–5-plicatæ, articulo 1mo multo breviore quam 2do. Pedes 6 postici coxis late clypeati, articulis reliquis paulo abbreviati.*" Remarks are appended to distinguish the genus from *Typhis*, together with the statement that, "this genus includes the *Typhis ferox* of Edwards, Crust., iii. 96." For *ferox*, *ferus* should be read. The type-species is *Thyropus diaphanus*. Claus, Platyscelíden, 1879, considers that *Typhis ferus* probably belongs to his genus *Hemityphis*: on the other three genera he says there can be no doubt, "dass Dithyrus und Typhis bei Dana lediglich als weibliche Formen zu Thyropus als dem männlichen Typus zu beziehen sind," *loc. cit.*, p. 7, and he gives the heading, "*Eutyphis* = *Typhis*, Risso, (*Thyropus*, Dana, Sp. Bate ♂ = *Dithyrus* Dana ♀, *Platyscelus* Sp. Bate ♀)," but he further says, "Die Untersuchung einer grossen Anzahl kleinerer und grösserer Typhiden aus sehr verschiedenen Meeren hat mich davon überzeugt, dass Charakterisirung der Gattungen auch nach Beseitigung der durch die sexuellen Verschiedenheiten veranlassten Irrthümer viel specieller gehalten werden muss, und dass in der *Edward*'schen Gattung *Typhis*, dem *Dana*'schen *Thyropus*, eine Reihe von Gattungen enthalten sind." p. 9. At p. 17 he suggests that *Thyropus diaphanus*, Dana, may be the same as his own new species, *Tanyscelus sphæroma*.

Subfam. 2. Pronoinæ, contains *Pronoe brunnea*, which may, in Claus's opinion, be the same as his *Euprono armata*, and *Lycæa ochracea*, as type-species of *Lycæa*, the following addition being made to the definition of that genus:—

"*Pigmenta oculorum grandia. Antennæ 2dæ sub capite celatæ et replicatæ et flagello longiusculo confectæ. Pedes 4 antici subcheliformes, reliqui mediocres: 2 ultimi breviores: coxæ sex posticæ angustæ. Abdomen in ventrem se non flectens.*"

Claus, 1879, agrees with Spence Bate that this definition scarcely suffices to distinguish *Lycæa* from *Pronoë*, but for independent reasons he considers Dana's genus fully tenable.

In his notes Dana recognizes *Leptomera*, Latr., as a synonym of *Proto*, Leach. He remarks, p. 830, "it is possible that the *Podocerus Leachii* (Kröyer), should form a distinct genus, as the animal lived in a tube like a Cerapus." At p. 832, he says, "*Glauconome* of Kröyer has the hands and antennæ and apparently the other characters of Unciola. Say describes the hands of the second pair in Unciola as *adactyle*; but they still are probably like those of Glauconome." In a note to *Anonyx*, Kröyer, he explains that he omits the genus *Ephippiphora*, White, from his synopsis, on account of its insufficient description. As to "*Leptochirus pilosus*," Zaddach, he asks, p. 910, "May the form be female only?" In a note on "*Iphimedia*, Rathke, D.," he says, "*Dexamine* of Leach, may perhaps be included here," and "the genus *Hyale* of H. Rathke," he says, "contains no characters in its description by this author, which do not apply equally well to species of Iphimedia." "*Amphithoe*, Leach, D.," he says, "includes *Pherusa* of Leach." In a note on "*Gammarus*, Fabr., D.," he mentions *Anathia*, Rathke, and *Eusirus*, Kröyer, but does not give them a place in the synopsis. The note on *Lepidactylis*, Say, remarks, "here falls *Bellia* of C. Spence Bate." In the addenda, p. 1595, he observes, "Page 908:—*Callisoma*, Costa (loc. cit.), appears to be identical with Lysianassa"; "Page 910.—*Niphargus* is the name of a new genus near Gammarus, proposed by Schiödte"; "Page 913. The genus *Laluria* (L. longitarsis) of Nicolet (loc. cit., Pl. 2, f. 8), is between the Gammaridæ and Corophidæ, and appears to be identical with Aora of Kröyer, which was also from Valparaiso."

1852. Liljeborg, Wilhelm.

Hafs-Crustaceer vid Kullaberg. Crustacea marina ad Kullaberg in Scania mense Septembris 1851 observata. Öfversigt af Kongl. Vetenskaps-Akademiens Förhandlingar. Årg. 9. 1852. No. 1 & 2. (Nionde Årgången. 1852. Stockholm, 1853). pp. 1–13.

Among the Crustacea of this district already noticed by others, Liljeborg mentions "*Caprella linearis*, Latr., Örsted, De regionibus marinis, p. 73." He observes that in *Ampelisca macrocephala* as in "*Ampelisca Gaimardi* Kröyer (Voy. en Scandinavie etc. t. 23, f. 1. a, à)" there are four eyes instead of the two to which the Amphipoda had hitherto been limited. In these four he found no trace of facets, or cones, and concludes therefore that they are simple, as given in the original definition of the genus with a query. In the species which he describes as *Ampelisca Eschrichti?* Kröy., he found only two eyes, but with creatures that burrow in the mud at considerable depths, he thought the eyes too unimportant to justify a generic distinction depending on their number. However, in 1855, as *Haploops tubicola*, this species became the type of his new genus *Haploops*. Goës subsequently discovered that *Haploops* agreed with *Ampelisca* in having four eyes. In specimens preserved in spirits the lower pair have a tendency to disappear. Liljeborg was the less inclined to lay stress upon the eyes from noticing that in certain Amphipoda which live at great depths, they are entirely wanting, "as, *e.g.*, in the genus *Stegocephalus*, Kröyer, and probably *Pardalisca* and *Œdiceros* Kr." As the last of these examples shows, it must not be too easily taken for granted that eyes are wanting, because they have not been detected, in species of Amphipoda, though Liljeborg's conclusion is justified that the possession of two eyes, given by Milne-Edwards as a general character for the order, cannot be attributed to it without reserve.

In the Latin description of "Ampelisca Eschrichti? Kroy.," corresponding as above-mentioned to *Haploops tubicola*, is included a description of the male, which refers to a separate species, called in 1855 *Haploops carinata*. He here remarks that Örsted, "(Naturhist. Tidsskr.

2:dra ser. 1 band., p. 403)," includes among the Crustacea from Drobak, a species under the name of *Ampelisca rotundata* Krüyer, a name which lapses for want of attendant description.

Ampelisca macrocephala, n. sp., is described, this being a species which in 1851 Liljeborg had supposed to be "*Ampelisca Eschrichti* Krüyer." *Amphithoë podoceroides*, Rathke, he found much smaller here than on the coasts of Norway.

Amphithoë compressa, n. s., here described, and thought to be very like *Amphithoë tenuicornis*, Rathke, was called *Atylus compressus* by Spence Bate, and later identified by Boeck with *Atylus swammerdamii*, M.-Edw.

Amphithoë pygmæa, n. s., is identified by Boeck with *Photis reinhardi*, Kröyer, 1842. Liljeborg thought it something like *Iphimedia obesa*, Rathke, which, he remarks, had anticipated Kroyer's *Microcheles armata*, 1846. In the list of v. Dueben's Crustacea, 1851, he had given "44. *Iphimedia* obesa, H. Rathke. 45. *Microcheles* armata Kr." He therefore here observes that the latter had proved to be a young specimen of *Œdiceros saginatus*, Kr.

Under *Gammarus locusta* (Lin.), he gives "G. Duebeni Liljeb.," as a synonym, and this description, "Oculi reniformes nigri, antennæ superiores longiores, flagello appendiculari 5–7 articulato; rami pedum spuriorum ultimorum insigniter inæquales, interior exteriore saltem tertia parte minor.—Vulgaris."

He describes *Gammarus maculatus*, n. sp., the name being preoccupied by Johnston, and the species being, as Liljeborg afterwards recognised, Montagu's, now known as *Metita obtusata*.

Gammarus longipes, n. s., which he thinks very like his own *Gammarus assimilis*, 1851, was called *Autonoë longipes*, by Bruzelius.

In "*Hyperia Latreilli* M.-Edw.," he notes that the young differ from the adult in respect to the antennæ. An account is appended by S. Lovén of the tubes constructed by *Ampelisca eschrichti*, Kroyer. Several specimens taken on one occasion in their tubes, proved to be all females. The close proximity of the tubes taken on another occasion suggested that the species might be gregarious.

1852. Sutherland, Peter C. White, Adam.

Journal of a voyage in Baffin's Bay and Barrow Straits in the years 1850–1851, performed by H.M. Ships "Lady Franklin" and "Sophia," under the command of Mr. William Penny, in search of the missing crews of H.M. Ships Erebus and Terror. London, 1852.

"In the neighbourhood of Berry Island dredging was frequently attended to," and "the display," he says, "of animal and vegetable life before us, when the dredge was emptied, was really wonderful. Whole heaps of Mollusca, Crustaceans, Annelidans, and Echinodermata could be seen tumbling out from among masses of sea-weed." Sutherland says that the sea bottom there is "the habitat of myriads of creatures belonging to the genus *Caprella*, *Cyclops*, *Gammarus*, etc." (p. 140). On p. 142 he gives a striking account of the voracity of the Gammarinæ, naming especially *Gammarus areticus*. Whether it were a dead seal or a live sucking-fish (*Lepadogaster*), short work was made of their prey.

In the Appendix, vol. ii. pp. ccvi, ccvii, White describes, according to Boeck, "*Gammarus nugax*, Sab., *Acanthonotus tricuspis*, Kr., *Amphithoë Edwardsii*, Sab., and *Stegocephalus inflatus*, Kr.; a species of *Anonyx*, and lastly *Caprella cercopoides*, n. s., which falls to *Caprella septentrionalis*, Kr." Mayer in 1882 thinks that, judging by the figure, Boeck's view of *Caprella cercopoides* is probably correct.

1853. Burgersdijk, L. A. J.

Land- en Zoetwater schaaldieren. (In Bouwstoffen v. e. Fauna v. Nederl. I. bl. 164.) 1853.

This work is included in Maitland's list of authorities, 1875. He refers to it only for one of the localities of *Gammarus pulex*.

1853. Costa, Achille.

Fauna del Regno di Napoli.

The genus *Guerinia*, Hope, is described, with the type species *Guerinia nicæensis*, which is figured.

Phronima, Latreille, is described, and the type species *Phr. sedentaria*, Forskål, to which *Pisitoe lerifrons*, Rafinesque, is united as a synonym, while *Phronima custos*, Risso, though not included in the synonymy, is declared in the "observations" to be also identical with Forskål's species. The genus *Phrosine*, Risso, is described, and of Risso's two species, *Phrosine semilunata* is fully described and figured, while *Phrosine macrophthalma*, which Costa had not himself seen, is briefly alluded to. Costa would have preferred to name the two respectively *cornuta* and *inermis*. He considers *Pisitoe bispinosa*, Rafinesque, though inaccurately described, probably the same species as *Phrosine semilunata*.

1853. Costa, Achille.

Descrizione di tre nuovi crostacei del Mediterraneo discoperti dal Rev. G. F. Hope. Estratta dal fascicolo 83° della Fauna del Regno di Napoli. 10 pages. 3 plates.

This work is obviously due to the pen of Achille Costa, although the new genus, and two out of the three species, are attributed to Hope.

The new genus *Guerinia* is thus described:—"Generis characteres essentiales. Pedes primi paris validissimi, prehensiles, manu magna valide uncinata; secundi graciles, haud prehensiles, ungue destituti. Antennæ superiores bisetæ; seta primaria articulo primo maximo. Oculi magni, reticulati, dorso fere contigui.

"Characteres naturales. Corpus crassum, parum compressum, dorso rotundatum. Caput antice horizontaliter rotundato-productum. Oculi maximi, dorso sub-contigui, totam fere capitis superficiem occupantes, distincte reticulati. Antennæ superiores bisetæ; seta primaria articulo primo valde elongato, valido: inferiores infra et inter superiores insertæ, basi contiguæ. Pedes primi paris manu magna crassa, ungue valde arcuato armata: secundi longi, graciles, articulo ultimo ciliis fimbriato, ungue nullo; reliqui simplices. Abdomen lamina horizontali terminatum."

In the observations that follow, this Crustacean is regarded as a sort of link between the Amphipoda and the parasitic Isopods, such as *Anilocra*. By Spence Bate, in the Brit. Mus. Catalogue, it is placed between *Lafystius* and *Lepidactylis*. The type species is named *Guerinia nicæensis*, and is beyond doubt generically, perhaps also specifically, identical with the later "*Trischizostoma Raschii*," Esmark and Boeck, 1860. Boeck, who had obviously not met with Costa's paper, fully describes the mouth-organs, and points out that the relations of the genus are with the Hyperidæ, Orchestidæ and Lysianassinæ. He places it by itself

in the second tribe of the Amphipoda, which he calls Prostomatæ, subsequently classing them as the first family of his second division, Gammarina. He states that the large finger of the first gnathopod is hinged, not as usually to the anterior, but to the lower hinder, angle of the hand, and directed forwards. That this is not shown in Costa's figure may have arisen from an accidental twisting of the hand in the specimen figured, or perhaps the artist had the unwonted feature before him, but could not believe his own eyes, and took the liberty of correcting nature, or we may argue from the researches mentioned below that Costa's specimen had not reached the age at which the peculiarity is developed. Boeck further differs from Hope by describing and figuring the third joint on the second peræopod as greatly expanded, by representing the first joint of the fifth peræopod in the complete figure as drawn out on the lower hinder angle instead of rounded off, and by describing the telson as split at the point, while in Hope's figure it is rounded and entire. But the figure of the telson in Boeck shows no slit, and the downward produced angle of the first joint of the peræopod is in the text and in a separate figure attributed to the fifth pair of feet, that is, the third peræopod, so that I am inclined to unite the two species in spite of differences which seem to me more likely to be due to inadvertence in the observers than to diversity in nature. This conclusion, independently arrived at, is more or less confirmed by the recent investigations of Bovallius, who, in 1886, describes and figures with great clearness and detail "the adult female" and "the young male" of Boeck's species, placing it in his new tribe of Amphipoda Synopidea. He is evidently, like Boeck, unaware of Costa's *Guerinia*, but he throws light upon it by showing that the position of the finger of the first gnathopods is normal in young specimens, and that in these the third joint of the second peræopod is not greatly expanded. On the other hand, he represents the telson as deeply excavated in the young, but in the adult female as having a smoothly rounded termination. "The description of Boeck," he says, "is not quite accurate; it seems that he has taken some characteristics from the adult animal and others from very young ones."

The second species described and figured is "*Callisoma Barthelemyi*, Hope." The differences mentioned, having to do, it seems, exclusively with comparative measurements, are probably not of specific value. The name is not included in the Brit. Mus. Catal., and the species is entered by J. V. Carus, 1885, as "non descripta." The description is as follows:—"C. antennis superioribus capite thoracisque articulo primo simul vix longioribus, seta primaria pedunculo parum breviore, inferioribus thoracis articuli septimi ♂, quinti ♀ marginem anticum attingentibus; epimeris quarti paris postice tertium anticum marginis inferi sequentium non ultra productis; pedibus spuriis abdominalibus fere æque terminatis. Long. lin. 3; lat. lin. 1. "Osservazioni. Molto affiné al *Call. Hopei*, A. Cost., dal quale nondimeno differisce per la falsa unghietta de' piedi anteriori assai più lunga, per le antenne in ambedue i sessi rispettivamente più corte, per gli epimeri del quarto anello un poco men prolongati posteriormente."

The third Crustacean of this paper is "*Jæra Hopeana*," Costa, an Isopod.

1853. COSTA, ACHILLE.

Relazione sulla memoria del Dottor Achille Costa, di Ricerche su' Crostacei Amfipodi del Regno di Napoli. Rendiconto della Società reale Borbonica. Academia delle scienze. Nuova Serie. Anno 1853. Bimestre di Settembre ed Ottobre. Napoli, 1853. pp. 166–178.

The report on Costa's paper is dated Napoli, 17 Settembre 1853, and signed by Giovanni Gussone, Giovanni Guarini, Benedetto Valpes. The characters of the new genera and species are

given in Latin. See Note on Costa, 1857. The names of the genera are *Arancops*, *Ichnopus*, *Egidia*, *Nototropis*, *Probolium*, *Elasmopus*, *Ceradocus*, *Microdeutopus*. The new species are *Orchestia mediterranea*, *Orchestia constricta*, *Arancops diadema*, *Arancops brevicornis*, *Lysianassa spinicornis*, *Lysianassa loricata*, *Lysianassa humilis*, *Ichnopus taurus*, *Egidia pulchella*, *Notrotopis* (sic) *spinulicauda*, *Amphithonotus spiniventris*, *Probolium polyprion*, *Amphithoe babirussa*, *Amphithoe gazella*, *Amphithoe tenella*, *Amphithoe aquilina*, *Amphithoe crassicornis*, *Amphithoe penicillata*, *Amphithoe elongata*, *Amphithoe microura*, *Amphithoe semicarinata*, *Elasmopus rapax*, *Gammarus plumicornis*, *Gammarus obtusunguis*, *Gammarus unguiserratus*, *Gammarus scissimanus*, *Gammarus punctimanus*, *Gammarus bispinosus*, *Gammarus orchestiipes*, *Leucothoe denticulata*, *Erichthonius bidens*, *Microdeutopus gryllotalpa*, *Corophium acherusicum*, *Vibilia speciosa*, *Hyperia pupa*.

1853. Gosse, Philip Henry, born 1810 (Hagen).

A Naturalist's rambles on the Devonshire coast. London, M.DCCC.LIII.

At page 367, after describing the chambers in the peduncle of *Chrysaora cyclonota*, Gosse says, "a little shrimp-like creature, about half an inch in length, with large lustrous green eyes (*Hyperia medusarum*), makes these chambers his residence." "There were three or four specimens on this *Chrysaora*, and I have found it parasitic on other large Medusæ. But there were also on the one I am describing a vast number of minute white specks, which on examination proved to be little *Crustacea*, and, as I suspect, the larvæ of this species. They are not larger than a grain of sand, shaped somewhat like a toad, with the abdomen distinctly separated, narrow, and bent abruptly under, in the manner of the *Brachyura*. (See Plate xxii. fig. 15)."

At page 379 (see also page 82), he discusses "The Mantis shrimp." He says "one can never take a living specimen of that beautiful zoophyte *Plumularia cristata*, without finding its numerous pinnated branches inhabited by curious Crustacea of the genus *Caprella*." He compares them with the Spider Monkeys of South America, with the tropical genus *Mantis* among insects, and for mode of progression, to the caterpillars of geometric moths. He has "seen the large red species swim, throwing its body into a double curve like the letter S, with the head bent down, and the hind limbs turned back, the body being in an upright position." He thinks that the capture of prey is helped by the sudden clutchings of the lower antennæ. "They consist of four or five stout joints, each of which is armed on its inferior edge with two rows of long stiff curved spines, set as regularly as the teeth of a comb, the rows divaricating at a rather wide angle." "The first and second pair of legs," he says, "(but especially the latter), have the last joint but one developed to a great size, while the terminal joint is so formed as to shut down upon it just as the blade of a clasp-knife does upon the handle. Then to add to the efficiency of this instrument of prehension, the great joint which represents the haft is armed with a double row of spines set at an angle so as to make a groove, into which the blade falls, and this latter is cut along each side of its edge into fine teeth like those of a file." He finds "several species even on the same small fragment of weed, if it be tolerably well peopled with *Plumulariæ* or *Pedicellinæ*, some much larger than others, and beautifully mottled with transparent ruby colour on a clear horn, and distinguished by variations in the relative size, in the shape, and in the armature of these formidable weapons; and there is a species larger still, of a dull purplish-red hue. But all have pretty much the same manners, except that the smaller species are more agile." It is obvious that the differences mentioned may only refer to age and sex, instead of being specific, as Gosse supposed, but undoubtedly on the Devonshire coast, *Caprella acanthifera*, *Caprella fretensis* and *Caprella acutifrons* may all be found in very close proximity.

At page 382 he introduces "The Caddis Shrimp," which has its tubes on *Chondrus crispus*, and which he proposes to name "*Cerapus Whitei*." Bate and Westwood with some hesitation call it *Siphonœcetes whitei*, Boeck doubtfully places it among the synonyms of *Cerapus abditus*, Templeton. At present the species remains indeterminate.

1853. LUCAS, HIPPOLYTE.

Essai sur les animaux articulés qui habitent l'île de Crête. Revue et Magasin de Zoologie pure et appliquée. 1855. No. 10. Paris. (Also, according to Hagen, in a separate form, Paris, 1853.)

Of Amphipoda he enumerates, pp. 465–466, "*Talytrus platycheles*," Guérin; *Gammarus fluviatilis*, Roesel, which he says, "Habite les sources d'eau douce de Stito, dans les environs de la Canée"; and *Gammarus marinus*, Leach, which "se plaît dans les sources saumâtres de l'Arnegro de Retino."

1853. QUATREFAGES, A. DE.

On the phosphorescence of some Marine Invertebrata. Annals and Magazine of Natural History. Vol. XII. Second Series. London, 1853. See also Annales des Sciences Naturelles, vol. liv. 3rd Series, and Silliman's American Journal of Science for March and July, 1853.

In a list, "cited almost entire from M. van Beneden, in which are enumerated the various species of invertebrate animals whose phosphorescence has been established," (p. 18), the only Amphipods mentioned are *Erythrocephalus macrophthalmus* [*melanophthalmus*] and *Gammarus pulex*. At page 183 the remark is made, that "the *Talitri*, so numerous on our sandy shores," "become luminous by contact with the phosphorescent water," not being phosphorescent in themselves.

1853. WESTWOOD, J. O.

The Annals and Magazine of Natural History. Vol. XII. Second Series. London, 1853. p. 44.

It is mentioned that in April 1853, Mr. Westwood communicated to the Linnean Society the discovery in a well near Maidenhead of *Niphargus stygius*, Schiodte, an animal hitherto only found in the caverns of Adelsberg. This has been since separated from Schiodte's species under the name *Niphargus aquilex*.

1854. NICOLET, H.

Atlas de la historia fisica y politica de Chile por Claudio Gay. Fauna. Paris, MDCCCLIV.

Plates of "Crustaceos," numbered 1, 2, 3, 4, have on 1, 2, and 4 the inscription "H. Nicolet ad nat. del," and on Number 3 "Nicolet del." The figures of Amphipods on Plate 2 are named at the foot of the plate as follows:—"4 *Orchestoidea tuberculata* Nic. 5 *Amphitoe chilensis*

Nic. 6 *A*———— *Gayi*, Nic. 7 *Nicea Lucasii* Nic. 8 *Lalaria longitarsis* Nic." Similarly those on plate 4 are named "4 *Caprella longicollis* Nic. 5 *C*———— *brevicornis* Nic." "7 *Cyamus gracilis* Anct." Anct. is perhaps a misprint for auct. an abbreviation of *auctorum*, but in the text, vol. 3, p. 256, 1849, *Cyamus gracilis* is properly referred to Roussel de Vauzème.

1854. SCHAUROTH, VON.

Ein Beitrag zur Paläontologie des deutschen Zechsteingebirges. Von Herrn v. SCHAUROTH in Coburg. Zeitschrift der Deutschen geologischen Gesellschaft. VI. Band. 1854. Berlin, 1854.

At page 560, the 15th article of this paper is headed "*Palæocrangon problematica* SCHLOTH. Taf. XXII. Fig. 2." Schlotheim's specimen of his *Trilobites problematicus* is, Schauroth says on the authority of Bronn's Nomenclator, no more to be found. Schlotheim's collection went into the Berlin Museum, but there Beyrich informed him the specimen no longer existed, and had been in vain searched for by Quenstedt. Schauroth considers that a little fossil from the Zechsteindolomite of Pössneck is the same species as that which Schlotheim described and figured. It has the exterior "überall chagrinirt und überdiess mit verschiedenen Höckern geziert." "Das *Kopfschild* ist von der Seite geschen fast dreieckig und zeigt an der vorderen Seite knotige Erhöhungen, welche als Insertionstellen der Fühler, Fresswerkzeuge und selbst der Augen gedeutet werden dürften." "Das *Brustschild* ist das grösste von allen Segmenten." The back is carinate, and the general appearance agrees very nearly with Kirkby's *Prosoponiscus problematicus*, but Schauroth seems to have regarded the pleon as the head. He thinks the nearest palæozoic forms are to be found in *Gitocrangon* and *Adelophthalmus*. Identifying it, rashly as I think, with Schlotheim's species, he says, "Ich schlage vor dieses Geschlecht Palæocrangon (aus παλαιός und ἡ κραγγών, ähnlich dem Richter'schen Gitocrangon, gebildet) zu nennen, den Körper selbst also *Palæocrangon problematica* SCHLOTH. zu bezeichnen."

1854. STIMPSON, WILLIAM.

Synopsis of the Marine Invertebrata of grand Manan; or the region about the mouth of the Bay of Fundy, New Brunswick. Smithsonian Contributions to knowledge. (Accepted for publication, January, 1853). Washington, 1854.

The Island of Grand Manan "is more properly an archipelago than an island." "It is surrounded on all sides by deep-water (a hundred fathoms or more)." Stimpson adopts Dana's division of the Tetradecapoda into Isopoda, Anisopoda and Amphipoda. In the second division he describes *Tanais filum*, n. s. Among the Amphipoda he gives *Caprella lobata*, Kröyer, which is *Caprella linearis*, Linn.; *Caprella sanguinea*, Gould, and *Caprella longimanus*, n. s., both of which in Mayer's opinion are too briefly described for recognition, though the latter may be *Caprella acanthifera*, Leach. *Caprella robusta*, n. s., which Spence Bate renamed *Caprella stimpsoni*, because the name *Caprella robusta* was preoccupied by Dana, is restored to its original name by Mayer, on the ground that Dana's *Caprella robusta* falls to *Caprella acutifrons*, Latr. *Caprella robusta*, however, must be considered to have lapsed as a synonym. *Ægina spinosissima*, n. s., is by A. Boeck with a ?, and by Mayer without one, made a synonym of Boeck's later name *Ægina echinata*. This identification is disputed by G. O. Sars, 1885. "*Caprella spinosissima*, Norman," from the

"Porcupine" Expedition, was given in Sir Wyville Thomson's Depths of the Sea, by mistake (according to Norman in Mayer, Caprelliden, p. 35, note 1) for *Caprella spinosissima*, Stimpson. Norman, however, in 1886, gives "Caprella spinosissima, Norman = C. horrida, Sars." A specimen supposed to be the female of the species in question was sent by Norman to Mayer, and proved to be in fact an *Ægina*, which in Mayer's opinion may represent a new species, to which he would in that case assign the name *Ægina spinosissima* Norman, but that is surely pre-occupied by Stimpson's species. That the specimen figured in the Depths of the Sea is a *Caprella*, I have satisfied myself by dissection of the mouth organs, and in fact it no doubt falls to the name *Caprella horrida*, Sars (see Note on G. O. Sars, 1885). *Cuciola irrorata*, Say, is mentioned. *Podocerus nitidus*, n. s., is described. The new genus *Leptothoë*, which Spence Bate identifies with *Mæra* of Leach, is thus defined :—

"Body linear, segments well separated, epimera very small; superior antennæ longest, with a long accessory flagellum; inferior ones subpediform; legs of the first two pairs with subcheliform hands, those of the second pair being largest, with uniarticulate fingers. Caudal stylets of the last pair very long, with equal lanceolate rami on short peduncles. This genus differs from *Podocerus*, Leach, in possessing accessory flagella to the superior antennæ; and from *Cratophium*, Dana, in its long nonuncinate terminal stylets, and in having the superior antennæ longest." The type species is "*Leptothoë Danæ*," now called *Mæra danæ*. Stimpson's *Cerapus rubricornis* which "inhabits flexible tubes, of sizes corresponding to that of the individuals, composed of fine mud and some animal cement by which it is agglutinated," is identified by S. I. Smith with *Ericthonius difformis*, Milne-Edwards. His *Cerapus fucicola* is identified by Sp. Bate with *Podocerus cylindricus*, Say, while Boeck doubtfully places both these designations under *Podocerus anguipes*, Kroyer, *Podocerus cylindricus*, however, being the eldest of the names. S. I. Smith gives *Podocerus fucicola* as an independent species, naming *Podocerus cylindricus*, Say, not Bate, *Corophium cylindricum*. Stimpson's *Cerapus fasciatus* is allowed by Sp. Bate to remain in that genus with a ? It cannot stay in that genus as defined by S. I. Smith, since the figure of the pleon shows that there are at any rate five rami on each side to the uropods, whereas in *Cerapus* there are only four. Stimpson doubtfully identifies *Orchestia gryllus*, Gould, with *Talitrus gryllus*, Bosc. His *Allorchestes littoralis* is recognised by S. I. Smith as *Hyale littoralis*. The tail is said to terminate in an arched lamella, which may be a way of expressing that it is cleft.

Lysianassa spinifera, n. sp., according to Spence Bate, Brit. Mus. Catal., p. 120 (omitted from index), "seems to be closely related to" his genus *Phædra*. It is thus described :—"Body smooth and shining, slightly compressed, but rounded above, broadest anteriorly, tumid at the head, and much compressed at the abdomen, which constitutes nearly one-half the length of the body. Epimera not very large. Head rounded, with a prominent down-curving rostrum, and rather large red eyes. Superior antennæ two-thirds as long as the inferior ones, thick at their bases, but tapering suddenly after the juncture of the long accessory flagellum, which is nearly one-half the length of the principal one. Inferior antennæ with very thick basal articles, and equalling in length two-thirds that of the body, their flagella constituting more than one-half their length. Legs hairy, all terminating in short hooked fingers; those of the first two pairs slender, longer than the rest, with the antepenultimate article in each a little expanded, but scarce sufficiently to form a hand. Posterior legs much shorter than usual, and provided along their edges with short spine-like hairs. First three segments of the abdomen serrated above on their posterior edges; last three compressed above into sharp spine-like projections, of which the middle one is the longest. Caudal stylets of the first pair very long and slender, projecting beyond the sharp extremities of the second pair, which are short, while those of the third pair are

long, with long lanceolate rami projecting beyond the others. The tail terminates in two long spines. Colour wine-yellow; inferior antennæ annulate with reddish. Length, 0·32 inch. Dredged in forty fathoms, on a soft muddy bottom off Long Island, G. M." It is scarcely necessary to remark that the armature of this species must distinguish it in a striking manner from the Lysianassinæ in general. Of his *Anonyx nobilis*, Stimpson says that it most resembles *Anonyx appendiculosus*, Krøyer, but the distinctions he mentions do not suffice to separate the two species, and *Anonyx appendiculosus* itself is not distinct from *Anonyx nugax*, Phipps. *Anonyx politus*, n. sp., according to Spence Bate, has nothing in the description to distinguish it from *Anonyx hollbölli*. *Anonyx hollbölli* of Bate, according to Boeck, = *Anonyx gulosus*, Krøyer, from which it may be inferred that *Anonyx politus* is a synonym of *Anonyx gulosus*, which is itself probably the same as "*Oniscus Cicada*," Fabricius. The new species *Anonyx pallidus* and *Anonyx exiguus* are both endorsed by Spence Bate, as also *Stenothoë clypeata* and *Leucothoë grandimanus*, although of the latter he observes, "this species closely resembles *Leucothoë articulosa*. The only differences seem to be the small coxæ, the length of the dactylos of the first pair of gnathopoda, and the colour of the American species." It may be noted that the dactylos of the first pair of gnathopoda in Stimpson's drawing agrees with that of *Leucothoë* (*articulosa*) *spinicarpa*, so that the species must be considered doubtful.

Oniscus serratus of Otho Fabricius is here named *Acanthonotus serratus*, a name which Boeck alters into *Acanthonotozoma serratum*. *Amphithonotus cataphractus*, n. sp., is regarded by Boeck as a type for the genus which he calls *Tritropis*, a preoccupied name, altered by S. I. Smith to *Rhachotropis*. *Amphithonotus*, Costa, had lapsed as a synonym of *Dexamine*.

Amphithoë virescens is identified by Spence Bate with *Amphithoë punctata*, Say. *Amphithoë maculata*, Stimpson says, "differs from the last species in being more robust and of a much harder structure; also totally in coloration." As the Amphipoda are sometimes extremely soft just after shedding the skin, one is inclined to believe that Stimpson may have laid too much weight on the texture of the integument, in separating this species from the preceding one. *Iphimedia vulgaris*, which is said to differ from *Amphithoë inermis*, Krøyer, by "its larger eyes and epimera, and much longer caudal stylets," is renamed by Sp. Bate *Atylus vulgaris*. *Amphithoë inermis* is taken by Axel Boeck as type of his genus *Pontogeneia*.

The new genus *Monoculodes* is thus defined:—"Body tumid anteriorly; head rostrate, with the eyes so close together as to appear one. Superior antennæ without accessory flagellum; inferior ones subpediform. Legs of the first two pairs with large subcheliform hands, formed of the last two articles of each; the antepenult joints having their inferior apices produced into slender thumbs. Legs of the posterior five pairs unguiculate, those of the last pair being exceedingly long. Caudal stylets all biramous; the rami being equal. Maxillipeds large, elongated, with unguiform terminal articles, and internal lamellæ of about one-half their length. Mandibles palpigerous." Stimpson adds, "this genus resembles *Eusirus* in the structure of the hands, and *Œdicerus* in its long posterior feet." The type species is *Monoculodes demissus*. The next two species mentioned are *Gammarus sabinii*, Leach, and *Gammarus macrophthalmus*, n. sp., the latter of which is named by Spence Bate *Gammaracanthus macrophthalmus*. *Gammarus pulex*, which Stimpson names as equivalent to *Cancer pulex*, Lin., *Oniscus pulex*, Mull., O. Fabr., and *Gammarus locusta* of Montagu, Krøyer and Gould, is referred by Spence Bate, who had received specimens from Stimpson, to *Gammarus ornatus*, Milne-Edwards, and later on by Stimpson himself to *Gammarus locusta*, J. C. Fabr. *Gammarus purpuratus*, identified both by Bate and Boeck with *Gammarus dentatus*, Krøyer, is placed by Bate in his genus *Megamœra*, by Boeck in the genus *Melita*, Leach.

The new genus *Ptilocheirus* is thus defined:—"Body broad, as in the *Corophidæ*, epimera large and strong, much higher than broad. Mandibles with greatly elongated palpi; maxillipeds with their internal lamellæ of half their own length. Superior antennæ appendiculate, inferior ones subpediform. Legs of the first pair subchelate, very thick and strong throughout their length, in the male; those of the second pair plumose, without hands, but minutely unguiculate; those of the third and fourth pairs small, slender, and tapering, with the last three articles forming a kind of hooked finger, but with no dilated hand, posterior three pairs strongly unguiculate; those of the last pair much the longest. Caudal stylets all biramous, those of the first two pairs with a strong spine projecting from the inferior apex of the peduncle, along with the rami."

"This genus resembles in most characters *Leptocheirus*, Zaddach, and may perhaps prove the same; that name, however, is preoccupied in insects. It has relations with the *Pontoporinæ* in its plumose hairs, and somewhat in the structure of the legs of the third and fourth pairs; while it also approaches those genera of the *Gammarinæ* which recall the *Corophidæ*." Since, however, Zaddach's genus was not, as Stimpson spells it, *Leptocheirus*, but *Leptocheirus*, Boeck seems to have done rightly in giving it precedence, so that *Ptilocheirus pinguis*, which Spence Bate has named *Protomedeia pinguis*, will now stand as *Leptocheirus pinguis*.

The new genus *Pseudophthalmus*, or as Stimpson spells it, *Pseudopthalmus*, is thus defined:—"Body greatly compressed, with large epimera. Head with an irregular deposition of blackish or reddish pigment anteriorly, in which are one or two orbicular clear spots on each side, without facets. Maxillipeds with five articles, of which the terminal one is oval; internal lamellæ with combs of spines at their apices. Mandibles palpigerous. Antennæ very slender, the superior ones with their basal articles much thickened, and without accessory flagella; inferior ones arising much behind the bases of the superior ones. Legs of the first and second pairs sometimes with small subcheliform hands, shorter than the antepenult segment, but often simply unguiculate; those of the third and fourth pairs elongated, tapering, with their second joints very small, the third expanded into a hand; posterior pairs short; last pair with very broad basal joints. Caudal stylets all biramous. Tail terminating in a thin lamella. Epimera and third and fourth pairs of legs with plumose setæ along their edges."

This genus had already been described by Kröyer under the name *Ampelisca*. The briefly described type species, *Pseudophthalmus pelagicus*, has become, therefore, *Ampelisca pelagica*. *Pseudophthalmus limicola*, according to Boeck, is obviously synonymous with *Ampelisca tenuicornis*, Lilljeborg. Spence Bate describes further from Grand Manan, "*Pseudophthalmus ingens*, Stimpson, MS.," which he had received from the author. Being an inch and a half in length, it is well named *Ampelisca ingens*. *Phoxus fusiformis* is identified by Spence Bate with *Phoxus plumosus*, Kroyer, which Boeck places in his genus *Harpinia*. "*Phoxus Kroyeri*" of Stimpson Spence Bate accepts, renaming his own later "*Phoxus Krüyeri*," *Phoxus simplex*. Boeck, on the other hand, gives up "*Phoxus Kroyeri*," Stimpson, as insufficiently described.

1854. WILLIAMS, THOMAS.

On the Mechanism of Aquatic Respiration and on the Structures of the Organs of Breathing in Invertebrate Animals. The Annals and Magazine of Natural History. Vol. XIII. Second Series. London, 1854.

On page 294 he discusses *Chitine*. On page 295 he says, "Every Crustacean is a water-breathing, every Insect an air-breathing animal. To this rule there can be found no real, many

apparent, exceptions." Of the heart, p. 296, he says, in the Pœcilopoda, Isopoda, Amphipoda and Læmodipoda, it is tubular in form, and occupies the mid-region of the dorsum, sends off arteries before, behind, and laterally, and receives the venous blood through lateral venous orifices." "*Caprella linearis*," is figured, pl. xvii. fig. 6., and portions of *Talitrus* on pl. xviii., to illustrate the circulatory system and the anatomy of the branchial organs. He remarks, p. 302, of the Amphipodan family, "the thoracic limbs are commonly said to be transformed into branchiæ at their bases. The depending edges of the dorsal plates (the epimeral of the tergal are) are however much more suitably organized than the proximal articulations of the legs. They are penetrated by a very dense system of canals. The epidermis is reduced to an extremely thin and transparent lamina. The component hexagonal cells may be readily observed. The outer or epidermal lamina is united to the opposite parallel lamina by dots of parenchyma. The blood streams in the intermediate passages. These parts therefore correspond in ultimate structure in the most exact manner with leaves of the branchiæ of the Crab."

1855. Bartels.

Gammarus pulex im Menschenmagen von *Bartels*. Mit einem Zusatz von Troschel. Verhandlungen des naturhistorischen Vereines der preussischen Rheinlande und Westphalens. Zwölfter Jahrgang. Neue Folge; Zweiter Jahrgang. Bonn, 1855. pp. 113–116.

Troschel points out that there are possibilities of mistake in such accounts, the more especially as Bartels was not an eye-witness of what had occurred. The specimens sent belonged to *Gammarus pulex*, Gervais.

1855. Bate, C. Spence.

On the Homologies of the Carapace and on the Structure and Function of the Antennæ in Crustacea. Annals and Magazine of Natural History. 2d Ser. Vol. XVI. London, 1855. pp. 36–46. (Read at the Linnæan Society, April 17, 1855.)

The subject of this paper, so far as it concerns the Amphipoda, is discussed at large in the British Association Report by Mr. Spence Bate, for 1855.

1855. Bell, Thomas, born 1792, died 1880 (W. P. Sladen), and Westwood, J. O.

The last of the Arctic Voyages; being a narrative of the expedition in H.M.S. Assistance, under the command of Captain Sir Edward Belcher, C.B., in search of Sir John Franklin, during the years 1852–53–54. With notes on the natural history, by Sir John Richardson, Professor Owen, Thomas Bell, J. W. Salter, and Lovell Reeve. Vol. II. London, 1855.

At page 404 the Amphipoda begin, and contain mention of "*Gammarus Sabini*, Leach;" "*Gammarus loricatus*, Sabine;" "*Gammarus boreus*, Sabine;" "Gammarus Kroyeri (n. s.). Plate XXXIV. fig. 4. Antennis superioribus inferioribus dimidio longioribus, abdominis segmentis quatuor anterioribus in medio, secundo et tertio ad angulum inferiorem posticum, in dente productis," the English description being followed by the remark that

"This species has a very close resemblance to *Amphitoe bicuspis* of Kroyer. It is however a true *Gammarus*, as the accessory filament of the superior antennæ does exist, although extremely small. *Hab.* Wellington Channel, in thirty-five fathoms." The name was preoccupied by Rathke, in 1843, and the species is identified by Boeck with *Melita dentata*, Kroyer, 1842. This is followed by "*Lycianassa lagena*, Kroy.;" "*Amphitoe lævinscula*, Kroy.;" "*Amphitoe Jurinii?* (Kroy.), a specimen in a broken state occurs, which may probably be of this species," given in the Brit. Mus. Catal. as a synonym of *Pherusa fucicola*, Leach; "*Acanthosoma hystrix*, Owen.;" "*Stegocephalus* (Kroy.) *Ampulla* (Phipps), Plate XXXV., fig. 1," which is re-figured by Westwood, "the figures hitherto published" by Phipps and Herbst (copying from Phipps) being "exceedingly imperfect and incorrect." Those in Kroyer's great work had probably not come under the author's notice.

At page 407 the Læmodipoda contain "*Caprella spinifera* (n. s.), Plate XXXV., fig. 2. Segmentis omnibus corporis spinis armatis." Figure 2c shows the mandible with its long three-jointed palp, which transfers this species to the genus *Æginа*. In the explanation of the plate it is thus given "2c, 'palpigerous mandibles?'" "2h, terminal segments of the body seen from above," is followed by "2i, the same seen sideways, showing a pair of short exarticulate filaments attached to the last leg-bearing segment, and a pair of similar appendages, accompanied by a pair of larger two-jointed ones, attached to the minute terminal representative of the abdomen." This species is identified by Spence Bate with *Æginа spinosissima*, Stimpson, 1854.

Mr. Bell concludes by saying, "For the elaborate anatomical details of the plates, and for the greater part of the description of them which I have adopted, I have to acknowledge my obligation to Mr. Westwood."

1855. Dana, James Dwight.

The Crustacea; United States Exploring Expedition during the years 1838, 1839, 1840, 1841, 1842, under the command of Charles Wilkes, U.S.N. Vol. XIII. Part. II. Philadelphia; printed by C. Sherman, 1852. Atlas, Philadelphia, 1855. 96 Plates. Amphipoda, Pl. 54–69.

Most of the drawings for this magnificent work were, the author states, made during the years 1838–1842, in the course of the cruise of the expedition. It is greatly to be regretted that the portions of the text and the sets of plates relating to the different groups of Crustacea cannot be separately procured. As it is, the work is rare, expensive, and unwieldy to handle, alike difficult for the carcinologist to get or to do without.

After the engraving, but before the colouring, of the plates, a large part of the original drawings were destroyed by fire in Philadelphia. The loss occasioned by this catastrophe is not likely to be soon repaired.

With the exception of *Phronima atlantica*, Guérin, Dana here figures all the species of Amphipoda which he describes as brought home by the expedition.

1855. Gosse, P. H.

Notes on some new or little-known Marine Animals. The Annals and Magazine of Natural History. No. XCI. July 1855, and No. XCV. November 1855. Vol. XVI. Second Series. London, 1855. pp. 27–36, 307.

At page 30, in the "Order Edriophthalma. Fam. Cyamidæ. Genus Cyamus (Fabr.)," Mr. Gosse introduces "*C. Thompsoni* (mihi). Plate III. fig. 11. Body about $\frac{1}{6}$th of an

inch in length. Five pairs of feet equally developed; all five-jointed; all with the penultimate joint large and ovate. Third and fourth segments each furnished with a single small oval appendage." "It was attached to one of two specimens of *Hyperoodon bidens*, the capture of which in Portland Roads was recorded in the 'Annals of Nat. Hist.' for November 1854." This species has since been made the type of a new genus, *Platyeyamus*, Lütken. See Note on Lütken, 1873.

At page 307, in the "Fam. Corophiadæ," *Unciola irrorata*, Say, is recorded from Weymouth.

1855. Gosse, P. H.

A Manual of Marine Zoology for the British Isles. Part I. London, MDCCCLV.

In "Subkingdom III. Annulosa," Gosse places "Class IV. Crustacea." These are divided into two sections :—

"Mouth prolonged into a sucker, ... *Thelastia.*
"Mouth armed with jaws, ... *Dactia.*"

The first section includes the Pycnogonidæ and other families. "Section II. Dactia," is divided into three orders, *Entomostraca*, *Edriophthalma*, *Podophthalma*. The Edriophthalma are distinguished from the other two by the following characters :—"The modified legs performing the office of gills; eyes sessile, immoveable; thoracic feet for walking, usually seven pairs; no carapace." It is thus subdivided :—

"Abdomen a rudimentary tubercle, without distinct members. Branchial vesicles suspended from the thorax, ... *Lœmodipoda.*
"Abdomen well developed, and provided with five or six pairs of members.
"Branchial vesicles almost always absent from the thorax. First five pairs of abdominal members almost of the same form, unsuited to locomotion, and apparently serving as gills, . . *Isopoda.*
"Branchial vesicles under thorax. First five pairs of abdominal members diversely formed, and serving for locomotion, . *Amphipoda.*"

To "Suborder I.—Lœmodipoda," he assigns "*Caprella* (Lamk.). Body lengthened, slender, cylindrical; both pairs of antennæ well-developed; feet long, but wanting on the second and third segments of the thorax," with the species *linearis* (fig. 223), *lævis*, *acuminifera*, *acutifrons*, *phasma*, *tuberculata*, *lobata*, *acanthifera*, *longispina*; "*Leptomera* (Cadérin). As *Caprella*, but all the segments of the thorax furnished with feet," with the species *pedata* (fig. 224); and "*Cyamus* (Lamk.)," with the species *erraticus*, *ovalis*, *gracilis*, *Thompsoni* (fig. 225). His "L. pedata" can be recognised from the figure as *Proto ventricosa*, but the figure of *C. linearis* is useless. No authorities are mentioned for the species, nor are any descriptions given.

"Sub-Order III. Amphipoda" is thus subdivided :—

"Fourth and fifth abdominal segments united; fourth and fifth abdominal appendages dissimilar, ... *Cheluracea.*
"Abdominal segments distinct; abdominal appendages similar.
"Foot-jaws covering only the bases of the preceding appendages, and forming a lip with three plates, but deprived of palps, . *Hyperiacea.*
"Foot-jaws very large, covering the whole mouth, and forming a lip terminated by four great horny plates and two very long palps, . *Gammaracea.*"

In the first Tribe, the Cheluracea, stands, as might be expected, only *Chelura terebrans*, Philippi (fig. 250). In "Tribe II. Hyperiacea," he places "*Hyperia* (Latr.). Second pair of antennæ style-shaped and unfolded; body inflated. H. Latreillei. Fig. 251; *n. s.* [H.] galba," and, "*Typhis* (Risso). Second antennæ folding on themselves so as to form three

or four elbows; first joint of fifth and sixth feet forming great oval plates, concealing all the others. T. monoculoides. Fig. 252; mag. $\frac{5}{1}$. [T.] nolens." Figure 252 is not a *Typhis*, but probably the *Cancer Gammarus monoculoides* of Montagu, now called *Stenothoë monoculoides*. It should be noticed that the letters *n. s.* after Fig. 251, do not mean *new species*, but *natural size*.

Tribe III. Gammaracea," are thus subdivided:—

Body depressed; epimera very small or obsolete; abdomen straight, normal; three last pairs of false feet tipped with swimming-plates; antennæ foot-shaped, ... *Corophiadæ*.

"Body much compressed; epimera very large, scale-like, and encasing the bases of the first four pairs of feet, posterior extremity formed for leaping.

"Superior antennæ longer than the footstalk of the inferior, and much longer than the head; mandibles carrying long palps; antennæ lash-like, ... *Gammaridæ*.

"Superior antennæ much shorter than footstalk of inferior, and scarcely longer than head; mandibles without palps, . . . *Orchestiadæ*."

"Family I. Corophiadæ, contains 1. "*Cerapus* (Say). Second feet fanged; fang two-jointed; all the antennæ without many-jointed lashes at the tip. C. pelagicus. [C.] falcatus. C. Whitei. Fig. 253; *mag.* $\frac{6}{1}$;" 2. "*Podocerus* (Leach). First and second feet fanged; fang one-jointed; inferior antennæ without lashes. P. variegatus. [P.] pulchellus. Fig. 254; *mag.* $\frac{2}{1}$;" 3. "*Corophium* (Latr.). Second feet not fanged; inferior antennæ without lashes. C. longicorne. Fig. 255; *mag.* $\frac{2}{1}$;" 4. "*Unciola* (Say). First and second feet fanged; all the antennæ tipped with many-jointed lashes; superior pair furnished with a minute appendage at the base of the lash. U. irrorata. Fig. 256; *mag.* $\frac{4}{1}$."

The small figure of *Cerapus whitei* seems to show a second gnathopod with a dilated wrist and narrow hand quite unlike the small cup-shaped wrist and dilated oval hand depicted for *Cerapus whitei* in "A Naturalist's Rambles on the Devonshire Coast," but the figure in this work is too small to build any argument upon. The generic description, it should be observed, says "fang *two*-jointed."

"Family II. Gammaridæ," contains *Gammarus* (Fabr.), with the species *locusta* (Fig. 257), *marinus*, *camptolops*, *pulex*, *grossimanus*, *longimanus*, *Cranchii*, *punctatus*, *carinatus*, *maculatus*; *Amphithoe* (Leach), with the species *punctata*, *fucicola*, *obtusata*, *Moggridgei*, *rubricata* (Fig. 258), *dubia*, *spinosa* (Fig. 266), *carino-spinosa* (this and *spinosa* being bracketed as "= *Dexamine* (Leach);" *Leucothoe* (Leach), with the species *articulosa* (Fig. 259); *Acanthonotus* (Owen), with the species *testudo*; *Anonyx* (Kröyer), with the species *albus* (Fig. 261) and *elegans*; *Opis* (Kröyer), with the species *typica* (Fig. 262).

"Family III. Orchestiadæ," contains *Talitrus* (Latr.), with the species *locusta* (Fig. 263); *Sulcator* (Bate), with the species *arenarius* (Fig. 264); and *Orchestia* (Leach), with the species *littorea* (Fig. 265) and *Deshayesii*.

As "*Genera apparently intermediate between the Edriophthalma and Podophthalma*," he places the Family Cumadæ, containing the genera *Cuma* (M.-Edw.), *Alauna* (Goodsir); *Bodotria* (Goodsir).

1855. Leydig, Franz.

Zum feineren Bau der Arthropoden. Archiv für Anat. und Physiol. Jahrgang, 1855. pp. 376–476. Taf. xv.–xviii.

See Note on Leydig, 1878. Pages 444, 445, 452 of this work are mentioned in the references.

1855. Liljeborg, W.

Om Hafs Crustaceer vid Kullaberg i Skåne. Öfversigt af Kongl. Vetenskaps-Akademiens Förhandlingar. Tolfte Årgången. 1855. Stockholm, 1856. pp. 117–138.

This is an appendix to the contribution of 1852. Attention is called to the neglect of the sexual characteristics in the Amphipoda, a better acquaintance with which would probably necessitate some changes in the established genera and species. As marks of the female, Liljeborg notes relatively larger epimera, more or less developed ovarial appendages by the side of the branchiæ, smaller antennæ and gnathopods, and often the presence of eggs in the pouch. Under the heading "*Crustacea marina ad Kullaberg in Scania mense Julii 1852 collecta*," he records, with full descriptions of the new species, *Ampelisca lævigata*, n. s.; *Ampelisca tenuicornis*, n. s.; "*Gammarus Sabini*," Leach; *Gammarus angulosus*, H. Rathke; *Gammarus poeciluru*s, H. Rathke; *Gammarus erythrophthalmus*, n. s.; *Gammarus macronyx*, n. s.; *Leucothoë articulosa* (Montagu), with a long description, an account of its differences from *Leucothoe furina* (Savigny), and a concluding observation that Krøyer's *Leucothoë clypeata* and *glacialis* as well as *Leucothoë norvegica* Liljeborg can scarcely be included in this genus; *Ischyroceras minutus*, Liljeborg, with a description, and a discussion of its relationship to *Ischyrocerus anguipes*, Krøyer, and *Ischyrocerus latipes*, Krøyer, which are both, he says, several times larger than *Ischyrocerus minutus; Erichthonius difformis*, M.-Edwards, with a long description, and a discussion of the relationship of *Erichthonius* to *Podocerus*, etc.; *Laphystius sturionis*, Krøyer, with a description; *Caprella lobata* (O. F. Müller); *Leptomera pedata* (Abildgaard).

Gammarus erythrophthalmus has been confused by Boeck, as we learn from G. O. Sars, with a different species. Liljeborg's account of his species is as follows:—"Corporis forma sat robusta; epimera parva. Longit. circ. 7 millim. Oculi magni, reniformes, rubri. Frons inermis. Dorsum laeve. Annuli tres postici abdominis sine aculeis. Antennæ longitudine mediocres, hirsutæ; superiores inferioribus parum longiores, pedunculi articulo primo ceteris crassiore, quam secundo vero breviore. Articulus secundus tertio non multo longior. Flagellum pedunculo paullo brevius, articulis circ. quindecim. Flagellum appendiculare longum, articulis sex. Antennæ inferiores pone superiores fixæ. Pedunculus earum eidem antennarum superiorum circ. longitudine æqualis, articulo basali infra processu longo, articulo secundo non plane apicem articuli primi pedunculi antenn. superiorum attingente, articulo tertio et quarto inter se circ. æqualibus. Flagellum articulis duodecim. Pedum thor. primi et secundi paris manus valde inæquales, hæ illis multo majores. Illæ fere ovatæ, carpo magnitudine circ. æquales, præsertim postice setosæ. Margines postici palmæ et carpi angulum acutum formantes; apud marem et feminam inter se similes. Hæ apud marem validæ, carpo multo majores, oblique triangulares, margine antico arcuato, postico infra oblique truncato, crenulato, setifero, processibusque tribus brevibus instructo. Apud feminam paullo minores sunt, ovatæ, et postice tantum processibus duobus præditæ. Pedes tertii et quarti paris sequentibus breviores, articulo tertio sat dilatato, ungue vero forma solita. Pedes sexti et septimi paris ceteris longiores, inter se circiter æquales, apicem pedum abdominalium ultimorum attingentes, articulo basali valde dilatato. Rami pedum abdominalium ultimorum conici vel stiliformes, supra et ad apicem aculeati, inter se et trunco longitudine circ. æquales, antecedentes paullum superantes. Appendix caudalis brevis et crassa, postice truncata, supra postice eminentiis duabus parvulis lateralibus aculeatis.—Color flavescenti-albidus fasciis dorsalibus lutescentibus. Rarus; in retibus piscatorum e 14–16 orgyarum profundo acceptus." From all known species within the genus (*Gammarus*) it differs, he says, by its red eyes. It is not an uncommon species, I may remark, on the south coast of Devonshire.

For *Ericthonius*, Milne-Edwards, Liljeborg proposes the following new definition :—"*Caput ab annulo primo thoracico disjunctum. Antennæ mediocres, non pediformes, et flagello appendiculari carentes. Capitis testæ lobuli oculiferi mucronati. Pedes primi et secundi paris subcheliformes, illi his minores. Femur pedum tertii et quarti paris dilatatum, et eodem pedum sequentium latius. Pedes abdominales ultimi vel sexti paris tantum uno ramo apicali, unguiformi. Appendix caudalis duplex, utrinque processu brevi formata.*"

Under the heading, "*Tillägg och anmärkningar vid de uti den förra uppsatsen öfver Crustacéerna i hafvet vid Kullaberg i Skåne lemnade beskrifningarne*," in place of "*Ampelisca Eschrichti?* Kröyer; Liljeborg: Öfvers. af Kongl. Vet. Akad:s. Förh. 1852, p. 6," he describes *Haploops*, n. g., thus :—

"*Oculi duo simplices, minutissimi. Caput mediocre. Corpus compressum, epimeris mollicis. Antennæ sat tenues, interdum longissimæ, appendice carentes, neque inferiores pone superiores insertæ. Mandibularum pars dentalis bifida. Palpus mandibularis longus, triarticulatus, processui magno, articulo primo palpi longiori, adfixus. Maxillæ solito modo formatæ. Laminæ maxillarum secundi paris breves et latæ, exteriores majores, interiores subtilissime ciliatæ. Palpus maxillarum tertii paris quadriarticulatus, articulo secundo reliquis majore, et articulo ultimo minimo, non unguiformi, apice setifero. Pedes primi et secundi paris graciles, et sequentibus minores, tamen subcheliformes, manu et ungue parvis instructi. Pedes tertii et quarti paris fere æquales, ungue longo et parum arcuato, et articulo penultimo et antepenultimo sensim confluentibus, ut una cum ungue quasi digitum mobilem forment, et hi pedes quodammodo prehensiles sint. Pedes quinti et sexti paris æquales, antecedentibus duobus paribus breviores, pone vergentes, ungue parvulo retro flexo, articulo basali valde dilatato, et articulo secundo et tertio brevibus. Pedes septimi paris articulo basali eodem antecedentium minore, oblongo, fere rectangulari, articulo quinto minimo, fere rudimentari, et unguis loco stilum minimum setiferum gerente. Pedum abdominalium ultimum par antecedentia superans, ramis duobus lamellosis. Appendix caudalis unica parva, lamellosa et profunde divisa. Mares et feminæ inter se parum dissimiles. Feminarum pedes thoracici appendice flabelliformi, ova tegente, carentes, ejusque loco appendicem linearem minutam habentes.*" The assigning of only two eyes to this genus is perhaps due to an error of observation.

"*Haploops tubicola*, mihi," is described as the type species, with the same reference as that for the genus. This is followed by the description of "*Haploops carinata*, mihi," with a reference to "*Ampelisca Eschrichti?* mas, Liljeborg; l. c."

Additional characters are given for the genus *Ampelisca*, Kröyer. *Ampelisca macrocephala*, Liljeborg, is redescribed, with a note that it stands very close to "*Ampelisca Eschrichti*," Kroyer. *Gammarus maculatus*, Liljeborg, is recognised as a synonym of *Cancer Gammarus obtusatus*, Montagu, and *Gammarus longipes*, Liljeborg, is redescribed. The latter has been referred by Bruzelius to his genus *Autonoë*, of which Boeck retains it as the type.

1855. Liljeborg, V.

Öfversigt af de inom Skandinavien hittills funna arterna af slägtet Gammarus Fabr. af V. Liljeborg. (Inlemnad den 10 Maj 1854). Kongl. Vetenskaps-Akademiens Handlingar för år 1853. Stockholm, 1855. pp. 443–460.

Accepting the genus *Gammarus* as defined by Milne-Edwards, Liljeborg here refers to a subdivision of it or a subgenus, for which he proposes the name *Gammaropsis*, those species which have the third uropods not laminar but stiliform, conical, and the telson single, tuberculiform. He notes that *Gammarus zebra*, Rathke, is a *Podocerus*; he describes his own species *Gammarus mutatus*, which Boeck identifies with *Gammarus locusta*; he

unites *Gammarus krøyeri*, Rathke, to *Gammarus pœcilurus* of the same author, both of which are synonyms of *Gammarus marinus*, in Boeck's view. Under the *Gammaropsis* division he describes *Gammarus erythrophthalmus*, n. s., which Boeck accepts as type of the genus *Gammaropsis*. Spence Bate and Bruzelius did not take account of the name *Gammaropsis*, as in Liljeborg it was only provisional, but to *Eurystheus erythrophthalmus*, Spence Bate, Boeck gives the name *Gammaropsis erythrophthalmus*. G. O. Sars, however, maintains that the species which Boeck describes under this name is not Liljeborg's species, "which, among other things, has the secondary flagellum on the upper antennæ considerably longer and consisting of numerous articulations, the lateral angles of the head rounded off, and the third pleon-segment's lower hinder angles not acute. Lastly, in Boeck's species, the pigment of the eyes is not red as in the typical form but black." A point which Sars does not mention is that in Boeck's species the fourth pleon-segment has, on the middle of the hinder rim, two small teeth, whereas Liljeborg expressly says "annuli abdominis supra sine aculeis." On the other hand, Boeck says nothing of the colour of the eyes, and Liljeborg says nothing as to the other points mentioned by Sars, except that the accessory flagellum is long, six-jointed. As Boeck does not appear to have himself taken the species which he describes, he probably had no means of ascertaining the colour of the eyes, but it still remains rather remarkable that both in his species and in Liljeborg's, the hands of the second gnathopods should be tridentate in the male and bidentate in the female. To Boeck's species Sars gives the name *Gammaropsis melanops*. For the opinion that *Gammarus* (*Gammaropsis*) *erythrophthalmus*, Liljeborg, had been earlier described as *Gammarus maculatus*, see Note on Johnston, 1827–1828. The other species here described as new, *Gammarus* (*Gammaropsis*) *macronyx*, is assigned by Boeck to *Protomedeia fasciata*, Krøyer.

The subdivision or subgenus *Gammaropsis* is thus defined :—

"† Rami pedum spuriorum ultimorum depressi, lamellosi. Gammarus."

"†† Rami pedum spuriorum ultimorum stiliformes, conici. Appendix caudalis unica, tuberculiformis, Gammaropsis." *a*) Pedes thor. 3:tii et 4:ti paris solito modo formati. Gammarus erythrophthalmus, n. s. *b*) Pedes thor. 3:tii et 4:ti paris forma singulari, ungue longissimo, parum arcuato, articulo 5:to et 6:to una formato. Gammarus anomalus, H. Rathke; Gammarus longipes, Liljeborg; Gammarus macronyx, n. s.

1855. LINDSTRÖM, G., born 1829 (G. O. Sars).

Bidrag till kännedomen om Östersjöns invertebrat-fauna. Öfversigt af Kongl. Vetenskaps-Akademiens Förhandlingar. Årg. 12. 1855. No. 2. Stockholm, 1856. pp. 49–73.

Lindström here describes the new genus *Bathyporeia* as follows :—"Antennæ superiores articulo primo pedunculi magno et tumido, flagello appendiculari perpusillo. Antennæ inferiores pedunculo gracili, fere duplo longiore pedunculo superiorum. Mandibulæ apice valde acuminato, palpo triarticulato, articulo secundo crasso. Palpus pedum maxillarium articulatus, articulo secundo lato et foliaceo, articulo tertio gracili, curvo et non ut plerumque ad apicem articuli præcedentis, sed, palpi quasi appendicularis modo, ad marginem exteriorem affixo. Pedes thoracici primi paris perbreves, debiles, articulo ultimo pyriformi, ungue valido. Pedes secundi paris præcedentibus duplo longiores, ungue carentes. Pedes tertii quartique paris inter se similes, ultimo articulo longo, gracili, curvo, ungue rudimentario. Quinti paris pedes femore magno, clypeiformi, articulo tertio lamelloso, articulo quinto sine ungue. Epimera parva, margine inferiore setis instructo. Pedes natatorii forma vulgari. Pedes spurii quarti quintique paris breves. Pedes spurii

sexti paris forma singulari: pars basalis duplo longior quam latior; ramus finalis interior rudimentarius et forma folii acuminati; ramus exterior magnus, biarticulatus; articulo primo lamelloso, parte basali ter longiore; articulo secundo parvo, acuminato, setis instructo."

The type species is described under the name *Bathyporeia pilosa*, and figured Tab. ii. figs. 1–11. *Pontoporeia affinis*, n. sp., is thus described:—"Oculi nigri, elongati. Antennæ inferiores superioribus longiores; antennæ superiores flagello appendiculari triarticulato. Annulus abdominalis quintus setis illis, quas habet P. femorata, carens. Partes femorales pedum, ut etiam epimera, ornatæ textura singulari cellulosa, quæ globulis adiposis formata est." It is figured Tab. ii. figs. 1–4. Lindström comments on the relationship of his species to the Arctic *Pontoporeia femorata*, to which, in the fuller description, he recognises it as coming very close. It was the only Amphipod he found at 40 fathoms, the greatest depth his dredging reached. Subsequently, he seems to have given up its specific distinctness. See Note on Möbius, 1873. *Gammarus locusta*, he says, may be found wherever sea-weed grows. He notes too, that there are certain forms of Crustacea which can stand great variations in the saltness of the water they inhabit. He mentions also *Amphitoë rathkii*, Zaddach, and *Corophium longicorne*, Latr.

1855. Meissner, Georg.

Beobachtungen über das Eindringen der Samenelemente in den Dotter (*Gammarus pulex*). Zeitschrift für wissenschaftliche Zoologie. VI. pp. 272–294. Taf. IX. 1855.

1855. Schiødte, J. C.

Om den i England opdagede Art af Hulekrebs af Slægten *Niphargus*. Oversigt over det Kgl. danske Vidensk. Selskabs Forhandlinger. Kjøbenhavn, 1855. pp. 349–351.

This paper is intended to show that the English well-shrimp, which Schiodte named *Niphargus aquilex*, is distinct from his *Niphargus stygius*, out of the caverns of Adelsberg and Lueg in Carniola. Bate and Westwood, i. 317, say that Schiodte has been misled into describing *Niphargus aquilex* with "dorso carinato," by examining dried specimens, but on other grounds they incline to agree with his discrimination of the two species in question.

1855. Stimpson, William.
or 1856?

Descriptions of some of the new Marine Invertebrata from the Chinese and Japanese Seas. By Wm. Stimpson, Zoologist to the U.S. Surveying Expedition to North Pacific, Japan Seas, etc. Lt. John Rodgers, Commander. [From the Proceedings of the Academy of Natural Sciences, May and June, 1855.] Vol. VII. 1854, 1855. Philadelphia. 1856.

The Amphipoda of this paper include *Phoxus geniculatus* and *Phoxus obtusus*, both, in Boeck's opinion, insufficiently described for identification. The three-jointed outer ramus of the last uropod in *Phoxus geniculatus* probably only indicates a two-jointed ramus with a terminal spine. *Dercothoë? productus* is another among the many riddles presented by

these numerous species briefly described and unfigured. The expression, "posterior caudal stylets with short rami, the outer ones uniform, the inner minute, spine-like," though not very intelligible, does not seem to suit either the genus *Cerapus* or the genus *Nænia* which are suggested by Spence Bate as alternatives for the reception of the species. *Amphithoë filigera*, *Gammarus flabellifer*, *Gammarus tenuicornis*, *Leucothoë stylifera* have not so far as I know been subjected to criticism or re-examination. *Allorchestes rubricornis*, *Allorchestes penicillata*, and *Allorchestes japonica*, in none of which is the telson described, will, I suppose, until further knowledge stand in the genus *Hyale*. *Orchestia pollicifera* is transferred by Spence Bate to *Talorchestia*, as the description shows that in this species the male is of the *Orchestia*-, the female of the *Talitrus*-, form. The next species described is *Corophium contractum*, and the two last are *Caprella luctator* and *Caprella gracilis*, which from the brief descriptions Mayer finds absolutely impossible to determine. Future investigation in the same locality may perhaps settle what species Stimpson meant by *Caprella luctator* with its second gnathopods "large, tridentate below, teeth unequal," and by *Caprella gracilis* "with a slender curved rostrum."

1855. STIMPSON, WILLIAM.
or 1856?

Description of some new Marine Invertebrata. By Wm. Stimpson, Zoologist to the U.S. Surveying Expedition to North Pacific, Japan Seas, etc., under direction of Commander C. Ringgold, U.S.N. [From the Proceedings of the Academy of Natural Sciences, July, 1855.] Vol. VII. 1854–5. Philadelphia. 1856.

Under the heading Choristopoda are given four new species of *Anthura*. After these comes *Caprella solitaria*, which Mayer pronounces absolutely unrecognisable; *Iphimedia obesa*, named apparently in ignorance of Rathke's species, and renamed "*Iphimedia Stimpsoni*" in the British Museum Catalogue, p. 374. Mr. Haswell in his Australian Catalogue gives *Iphimedia? ambigua*, but does not mention Stimpson's species, which was taken also at Port Jackson. Mr. Haswell does not specify reasons for doubting the genus of his species. There is more obvious reason for hesitating to keep Stimpson's species in Rathke's genus as he speaks of the gnathopods having "equal subcheliform hands of moderate size," whereas in species of *Iphimedia* (Rathke, not Dana) they are generally very small.

Œdicerus fossor is described at some length. It was taken at Botany Bay. Mr. Haswell considers that his own species *Œdicerus arenicola* from Shark Island, Port Jackson, may be identical with it. *Gammarus rubro-maculatus* from Port Jackson, referred to the genus *Mœra* by Mr. Haswell, is now considered by that author to cover his own species *Mœra spinosa* and *Mœra ramsayi*, and Mr. Chilton's *Mœra festiva*. Differences in the form of the second gnathopods had been the chief ground of distinction, but he finds "on examining a series of specimens, a perfect series of gradations in this respect from the form figured by Stimpson to typical forms of *M. spinosa* and *M. Ramsayi*." There are no references to any figure of Stimpson's species either in Mr. Haswell's own works or in the British Museum Catalogue or in the copy of Mr. Stimpson's work kindly lent me by Mr. Spence Bate.

Leucothoë affinis, from False Bay, Cape of Good Hope, will be difficult to distinguish from its immediate relations. *Anonyx variegatus* from Simon's Bay, Cape of Good Hope, has been taken again in the same locality by the Challenger Expedition. It is re-described as *Lysianassa variegata* in the Brit. Mus. Catalogue.

1856. Bate, C. Spence.

On the British Edriophthalma. [From the Report of the British Association for the Advancement of Science, for 1855. Meeting held at Glasgow in September]. London. 1856. pp. 18–62. Plates XII.–XXII.

This Report considers the second division of Crustacea as *Edriophthalma*, using Leach's term as synonymous with *Tetradecapoda* of Blainville, and *Choristopoda* of Dana, though recognising that not all sessile-eyed Crustacea belong to the division, and that not all members of it have fourteen legs. Dana's view is accepted that the *Læmodipoda* of Latreille cannot rank as an order parallel to the *Amphipoda*, but his order of *Anisopoda* is not approved, the true view being supposed to be that *Læmodipoda* and *Anisopoda* should be separated from *Amphipods* and *Isopods* proper as subordinate groups.

In a discussion headed "The Homologies," the following opinion is advanced :—"The epistome appears with little doubt to be the inferior aspect of the mandibular ring, which is seen on the external lateral surface of the head, and which can be identified from the fact of its carrying the mandibles. This relation of the epistome to the mandibular segment is not admitted by Mr. Dana, who rather, from analogy with the higher types, than by direct evidence of the subject before him, identifies the epistome as belonging to the inferior (or external) antennal segments." Two modes of expression are applied to the Amphipod extremity or telson. In one it is spoken of as the twenty-first ring, only "to be contemplated in the character of an obsolete segment with its rudimentary appendages;" in the other, "it is a rudimentary appendage, modified upon the type of the preceding three" (pairs of appendages). I may here remark that Milne-Edwards, Hist. Nat. des Crust., pl. i. p. 23, regards the telson definitely as the twenty-first ring or segment. He considers that the cleft telson in certain species of Amphipods offers a striking example of the division of a ring into two symmetrical and lateral halves. He adds in a note that this is seen in *Gammarus othonis*, *Gammarus locusta*, &c.; but that in most Amphipods these rudiments of the seventh abdominal segment are completely wanting. This is a very strange observation for him to make, and quite the reverse of the fact. Huxley, The Crayfish, p. 161, regards the telson as a median outgrowth of the sixth abdominal segment, which has become moveably articulated therewith.

After a detailed account of the mouth-organs, gnathopods and peræopods, Mr. Spence Bate produces many arguments to show that the epimeron or side-plate in the Amphipoda "belongs to the leg and homologically is the first joint (or coxa), and that it is not a lateral or separate portion of the annular segments of the body of the animal, and in fact that no side pieces or epimerals exist." He maintains the following propositions :—

"1st. That seven joints are the normal number in the legs of all the Malacostracous Crustacea.

"2nd. That the branchia is normally an appendage of the leg and attached to the coxa.

"3d. That the moveable power of the leg is always between the coxa and the leg, and never between the coxa and the body.

"4th. That the coxa (the so called epimeral) in *Amphipoda* overlaps the segment to which it is attached, and except by a small portion only, is not united by the whole of the margin in juxtaposition with the segment.

"5th. That there are no epimerals where there are no legs.

"6th. That epimerals are found in no other type, except the *Edriophthalma* among Crustacea."

It does not seem inconsistent with these arguments to suppose that the first joint of the leg is in fact coalescent with the side plate, and that the side plate is a protective outgrowth from the segment.

The microscopic structure of the Integumentary Skeleton is discussed; the process of moulting described; the fact noticed that the Amphipoda do not appear to be capable of throwing off a wounded limb; the "auditory cilia" of the upper antennæ are considered; the denticle at the base of the lower antennæ is regarded as an olfactory organ; this is now generally recognized as a duct for the excretion from the antennary gland. The internal structure of an Amphipod is very fully described. Some remarks are made upon the development of the young. The paper concludes with a list of all the then known British species, including many new ones in various genera to be subsequently described. The names which do not reappear, or reappear with important changes, in Mr. Spence Bate's list in 1857, are as follows:— *Montagua dubius*, perhaps represented by "Montagua Alderii;" *Scopelocheirus breviatus*, for which appears *Scopelocheirus crenatus*; "*Amanonyx Guerinianus*," omitted; *Westwoodea caculus*, altered to *Westwoodia caculo*; *Westwoodea carinatus*, altered to *Kröyera carinata*; *Gammarus elegans*, altered to *Urothoë elegans*; *Thersites Guilliamsonia*, altered to *Thersites Guilliamsoniana*; *Podocerus pelagicus*, Edwards, omitted; *Siphonocetus dubius*, omitted; *Læstrigonus Fabrcii*, Edwards, omitted; *Ægina longispina*, Kröyer, referred to Dana's genus, *Protella*; *Caprella lævis*, Goodsir, omitted; *Caprella acanthifera*, Leach, placed as a synonym of "Caprella acuminifera, Edwards;" *Caprella acutifrons*, Desm., omitted; *Caprella phasma*, Latr., omitted, "*C. Phasma?* (Latr.)," being given as a synonym to *Protella longispina*.

Plates xii. to xxii. give valuable illustrations of the structure, both external and internal of the Amphipoda. They do not, however, supply the want of descriptions, so as to give any scientific value to the names of new genera and species here first published. On plate xvi. the terms applied by Milne-Edwards to the seven joints of a leg or equivalent appendage are contrasted with their abbreviated equivalents as used by Mr. Spence Bate, (1) *Coxopodite* shortened to *coxa*, (2) *Basopodite* to *basis*, (3) *Ischiopodite* to *ischium*, (4) *Meropodite* to *meros*, (5) *Carpopodite* to *carpus*, (6) *Propodite* to *propodos*, (7) *Dactylopodite* to *dactylos*.

In view of their forthcoming work on the British Sessile-eyed Crustacea, the following Table was drawn up in concert by Messrs. Bate and Westwood on this occasion:—

Classis Crustacea. Subclassis I. Malacostraca.

Edriophthalma (Legio II).

Order.	Division.	Subdivision.	Group.	Tribe.	Family.	Division.	Subfamily.	Genus.
Amphipoda,	Normalia,	Gammarina,	Vagantia,	Saltatoria,	Orchestidæ,			Orchestia.
				Natatoria,	Gammaridæ,		1. Stegocephalides,	Montagua.
							2. Lysianassides,	Lysianassa.
							3. Tetromatides,	Tetromatus.
							4. Pontoporeides,	Sulcator.
							5. Gammarides,	Gammarus.
							6. Leucothoides,	Leucothoë.
			Domicola,		Corophiidæ,	Nidifica,	Podocerides,	Podocerus.
						Tubifica,	Cerapides,	Siphonocetus.
							Corophiides,	Corophium.
					Cheluridæ,			Chelura.
		Hyperina,			Hyperidæ,			Hyperia.
					Phronimidæ,			Phronoma.
					Typhidæ,			Typhis.
	Aberrantia,				Caprellidæ,			Caprella.
Isopoda,	Normalia.							
	Aberrantia.							

1856. Dana, James Dwight.

Catalogue and descriptions of Crustacea collected in California by Dr. John L Le Conte. Proceedings of the Academy of Natural Sciences of Philadelphia. Vol. VII. 1854, 1855. Philadelphia, 1856. pp. 175–177.

The Amphipoda are thus described :—

"*Orchestia Pickeringii*, D., Rep. Crust. Exp. Exp. p. 882, pl. 59, f. 9.

"*Orchestia Californiensis*, D. Oculi majusculi. Antennæ 1mæ perbreves; 2dæ crassæ, dimidio corporis multo longiores, marginibus subtilissime setulosæ; flagello parce longiore quam articulum precedens, depresso, ferme 18 articulato, articulis non oblongis, partim transversis. Pes 1mus articulo 4to angusto, infra unâ spinâ armato; 5to angusto, breviore, processu parvo infra armato, apice oblique truncato; ungui brevi, vix digitiformi. Manus 2da grandis, subovata, infra palmâ subexcavatâ, spinam versus apicem acutam gerente, digito sat longo. Pedes sex postici spinulis brevibus multis ornati.—Long. 7‴.

"The 7th pair of legs is but little longer than the 6th, and much longer than the 5th.

"*Allorchestes angustus*, D. Epimeræ perlatæ, 4tâ multo latiore quam longa, 5tâ angustâ subæque bilobatâ. Pedes 1mi debiles, manu paulo oblongâ, apice truncatâ, palmâ terminali bilobatâ, carpo subtriangulato. Manus secunda, subovata, palmâ rectiusculâ, inermi, parce pubescente; carpus brevis, processu tenui infra prolongatus. Pedes sequentes nudiusculi, marginibus articulorum postici nudis, spinulis totis parvulis et remotis. Long. $4\frac{1}{2}$‴.

"Owing to the broad epimerals, the animal is narrow with high sides."

1857. Anonymous (? Halliday).

Description of Crustacea (with a Plate). The Natural History Review: A quarterly journal of zoology, botany, geology and palæontology. No. I. January, 1857. London and Dublin.

The Latin diagnoses are given of Schiodte's genus *Niphargus*, and his species *stygius* and *aquilex*. The full account of the former is given in English, as applying equally to the latter, except for the differences mentioned in the diagnoses. As these amounted to little more than assigning a smooth back to *stygius* and by mistake a keeled one to *aquilex*, Spence Bate was misled by this paper, he says, to assume the identity of the two species.

The paper also gives the Latin diagnosis of *Bathyporeia*, Lindstrom, and in English the full description of *Bathyporeia pilosa*, the type species. A comparison is instituted between this genus and *Anonyx*, Kr., and the observation made that "the form of the first pair of feet has a remarkable resemblance to that in Anonyx." As no particular species of *Anonyx* is mentioned, it is difficult to estimate the merit of this comparison.

1857. Bate, C. Spence.

A Synopsis of the British Edriophthalmous Crustacea. Part 1. Amphipoda. The Annals and Magazine of Natural History. Number CX., for February 1857. Ser. 2, Vol. 19, pp. 135–152. London, 1857. 21 pages.

The classification adopted in the genus *Orchestia* is that given by Dana, including the three subgenera, *Talitrus*, *Talorchestia* and *Orchestia*. The new species briefly described are *Orchestia lævis*, later removed to *Orchestia mediterranea*, Costa; "*Allorchestes Danai*," in

the Brit. Mus. Catal., transferred to *Allorchestes nilssonii*, Rathke; *Allorchestes imbricatus* now *Hyale pontica*, Rathke; "*Galanthis Lubbockiana*," which does not differ from *Allorchestes imbricatus*; *Montagua marina*, now *Stenothoë marina*; "*Montagua Alderii*," now *Metopa alderii*, according to Boeck; *Montagua pollexiana*, now *Metopa pollexiana*, according to G. O. Sars, but see also Note on Liljeborg, 1850; *Danaia dubia*; "*Lysianassa Audouiniana*," by Boeck referred to *Aristias* (*Anonyx*) *tumidus*, Kröyer; *Lysianassa marina*, afterwards referred to *Lysianassa atlantica*, Milne-Edwards; *Scopelocheirus crenatus*, later transferred to *Callisoma crenata*; *Tetromatus typicus*, transferred by Spence Bate to *Ampelisca gaimardii*, Kröyer, by Axel Boeck re-established as an independent species, *Ampelisca typica*, Spence Bate, while the species described by Boeck is said by G. O. Sars to be undoubtedly the male of *Ampelisca tenuicornis*, Lilljeborg, with which again Bate's species does not agree. Hoek, Carcin. p. 145–6, decides for calling it *Ampelisca carinata*, which (with Norman) he supposes to be the male of *Ampelisca æquicornis*, Bruzelius; "*Tetromatus Bellianus*," transferred by Spence Bate to *Ampelisca belliana*, by A. Boeck to *Ampelisca lævigata*, Lilljeborg; *Westwoodia cæcula*, afterwards changed to *Westwoodilla cæcula*; *Kröyera carinata*, changed to *Monoculodes carinatus*; "*Phoxus Kröyerii*," transferred to *Phoxus simplex*, Spence Bate; "*Phoxus Hotbolli*," afterwards recognised as Kröyer's species of the same name; *Sulcator marinus*, later transferred to *Urothoë marinus*; *Darwinia compressa*, identified by Boeck with *Laphystius sturionis*, Kröyer; "*Acanthonotus Orenii*," afterwards referred to *Acanthonotus* (*Oniscus*) *testudo*, Montagu, then reinstated as *Acanthonotus orenii*, and finally, Brit. Sess. Crust., vol. ii. p. 528, referred to *Epimeria* (*Gammarus*) *cornigera*, Fabricius; *Dexamine bispinosa*, placed by Boeck in his genus *Haliragea*; "*Dexamine Gordoniana*," afterwards recognised as a synonym of *Atylus* (*Amphitoë*) *swammerdamii*, Milne-Edwards; "*Calliope Leachii*," later referred to *Calliopius* (*Amphithoë*) *lævisculus*, Kröyer; "*Lembos Cambriensis*," transferred to *Microdeutopus* (*Gammarus*) *anomalus*, Rathke; *Lembos versiculatus*, transferred by Spence Bate to the genus *Microdeutopus*, by Boeck thought probably to belong to *Autonoë*; "*Lembos Dannoniensis*," later recognised as synonymous with *Microdeutopus gryllotalpa*, Costa; *Lonchomerus gracilis*, later placed in Kröyer's genus *Aora*, as *Aora gracilis*; *Eurystheus tridentatus*, later seen to be a synonym of *Gammarus erythrophthalmus*, Liljeborg, and by Boeck therefore named *Gammaropsis erythrophthalmus*, though he seems, according to G. O. Sars, to have confused with it a different species; *Gammarella orchestiformis*, later found to be synonymous with *Gammarella* (*Gammarus*) *brevicaudata*, Milne-Edwards; *Gammarus inæquimanus*, subsequently found to be a synonym of *Melita* (*Cancer Gammarus*) *palmata*, Montagu; *Gammarus? pallidus*, afterwards placed in a new genus as *Liljeborgia pallida*; *Urothoë elegans*, stated scarcely to differ from *Urothoë irrostratus* of Dana, but separated from it because forms from the Sooloo Sea can scarcely be supposed to belong to the same species as British forms—an unsafe ground of distinction; "*Thersites Guilliamsoniana*," afterwards found to be a synonym of *Bathyporeia pilosa*, Lindström; *Thersites pelagica*, the ♂ of the preceding species; *Leucothoë procera*, subsequently made a synonym of *Leucothoë* (*Lycesta*) *furina*, Savigny; "*Pleonexes Gammaroides*," later named *Amphitoë gammaroides*, and probably belonging to the division that has been named *Sunamphithoë*, the *Anisopus* of Templeton; *Amphithoë littorina*, referred by Boeck to *Amphithoë podoceroides*, Rathke, probably the same as *Amphithoë rubricata*, Montagu; *Sunamphitoë hamulus*; *Sunamphitoë conformata*, probably the male of the preceding species; (in this and the preceding genus the spelling *-thoë* was afterwards adopted for the termination of the names); "*Cyrtophium Darwinii*," better named *Platophium darwinii*; *Erichthonius difformis*, here entered without name of any author for the species, but afterwards in the Brit. Mus. Catal. distinguished from *Erichthonius difformis*, Milne-Edwards, and made synonymous with *Cerapus abditus*, Templeton; "*Siphonoecta*

Krögeranus," afterwards assigned to *Siphonœcetes* (*Cerapus*) *whitei*, Gosse, with a suggestion in the Brit. Sess. Crust., p. 467, that it may probably be the female of *Siphonœcetes typicus*; by Boeck it is united to *Cerapus abditus*, Templeton; *Siphonœcetus crassicornis*, by G. O. Sars renamed *Cerapus crassicornis*; *Dyopedos porrectus*, afterwards named *Dulichia porrecta*; *Dyopedos falcatus*, afterwards named *Dulichia falcata*; "*Proto Goodsirii*," no doubt the same as *Proto ventricosa*, O. F. Müller.

The new genera are explained as follows:—Family I. Orchestidæ; thus defined:—"The upper antenna shorter than the lower. The coxæ well-developed; the posterior pleopoda short and robust, the last being single." Genus 3, *Galanthis*, "Lower antenna scarcely longer than the upper. Mandible non-palpigerous. Posterior pleopoda Orchestiform. Telson divided." This genus, in the Brit. Mus. Catal., is made a synonym to *Nicea* of Nicolet, in my view identical with *Hyale*, Rathke.

"Family II. Gammaridæ. Body compressed. Legs long and slender. Posterior pleopoda well-developed, the last being generally the longest.

"Subfamily I. Stegocephalides. Antennæ subequal. Coxæ of the four anterior legs immensely developed."

Genus 1, *Montagua*, "Upper antenna without secondary appendage. Mandibles non-palpigerous. Hands of both gnathopoda subcheliform. Posterior pleopoda single-branched. Telson entire." The name *Montagua* was pre-occupied. The genus falls to the earlier *Stenothoë* of Dana. Spence Bate included in it some species which had the mandibles palpigerous; these have been referred by Boeck to his genus *Metopa*. *Probolium*, Costa, is likewise a synonym of *Stenothoë*. Costa did not describe the mandibles, but in the type-species, *Probolium polyprion*, Boeck found them to be non-palpigerous.

Genus 2, *Danaia*, "First pair of gnathopoda simple; last pair of pleopoda with a single stylet." In the British Sess. Crust., vol. i. p. 67, a fuller definition is given as follows. "Antennæ subequal. Superior antennæ without secondary appendage. Mandibles destitute of a palpiform appendage. First pair of gnathopoda simple. Second subchelate. Telson single." Boeck in 1870 established a new genus *Cressa*, with type-species, *Cressa Schiödtei*, distinguished from Bate's *Danaia* by having a very long triarticulate mandibular palp. G. O. Sars, 1882, says that my figure of *Danaia dubia*, 1876, shows clearly that it is identical with Boeck's *Cressa Schiödtei*. In that case the later definition of *Danaia* requires amendment. My own specimens of *Danaia dubia* were destroyed by an accident, before my attention was called to the special interest attaching to the mandibles.

"Subfamily II. Lysianassides. Upper antenna short, pyriform. Second gnathopod long, feeble, and obsoletely subcheliform." Genus 4, *Scopelocheirus*:—Upper antenna furnished with a secondary appendage. First pair of gnathopoda terminating in a brush; second cheliform. Telson double." This genus had been anticipated by *Callisoma*, Costa. See Brit. Mus. Catal. p. 84.

"Subfamily III. Tetromatides. Eyes four; not compound. Upper antenna in advance of the lower." Genus 6, *Tetromatus*:—"Head projecting forward as a snout. Upper antenna proceeding from the extremity; lower situated far posteriorly. Mandible palpigerous. Gnathopoda but imperfectly prehensile." This genus was soon after recognised as equivalent to *Ampelisca*, Kröyer.

"Subfamily IV. Pontoporeides. The shell of the head developed anteriorly beyond the head so as to look like a hood. Upper antenna situated in advance of the lower." Genus 7, *Westwoodia*:—"Shell of the head produced to a point. Upper antenna not appendiculated. Telson entire." The name *Westwoodia* being pre-occupied was soon after altered to *Westwoodilla*. Genus 8, *Kröyera*:—"Head like *Westwoodia*. Hands of gnathopoda well-developed, and formed by the *carpus* being produced so as to meet the apex of the *dactylus*." In the Brit. Mus. Catal., p. 104, *Kröyera carinata*, the only species assigned to the genus

in this Synopsis, is referred to the genus *Monoculodes*, Stimpson. But in the Catalogue the name *Kröyera* is retained for a genus thus defined:—"Cephalon produced and anteriorly depressed. Eyes not coalesced into one. Superior antennæ not appendiculate. First pair of gnathopoda subchelate; carpus inferiorly produced along the inferior margin of the propodos. Second pair chelate; carpus produced along the inferior margin of the propodos. Fifth pair of pereiopoda considerably longer than the preceding. Posterior pair of pleopoda biramous. Telson squamiform, entire." Boeck spells the name as *Kröyeria*, and then rejects it, as pre-occupied in a different group of Crustacea, in favour of his own later name, *Pontocrates*. *Kröyera* having in fact lapsed as a synonym of *Monoculodes* could not properly be revived, and must therefore yield to *Pontocrates*, Boeck, unless it should prove that *Kröyera carinata* has a right to be restored. See Note on J. Sparre Schneider, 1885.

"Subfamily V. Gammarides. The upper antenna not in advance of the lower, and never rudimentary. Gnathopoda generally prehensile. Last pair of posterior pleopoda terminating in two stylets which are more or less fringed with cilia." Genus 11. *Darwinia*:—"Pereion inflated. Upper antenna without secondary appendage. All the feet terminating in simple hooks, not subcheliform." This genus Boeck identifies with *Lafystius*, Krøyer. Genus 15. *Calliope*, now *Calliopius*, is given from Leach, MS., and thus defined:—"Upper antenna without secondary appendage. All the feet with strong semi-prehensile claws. Telson single. Mandible palpigerous." Genus 17. *Lembos*:—"Upper antenna with secondary appendage small. First gnathopod larger than the second. First of the posterior pereiopoda very short, the last very long. Telson rudimentary." Afterwards referred to *Microdeutopus*, Costa. Genus 18. *Lonchomerus*:—"Like *Lembos*. Meros of first gnathopod produced into a long spine." Afterwards identified with *Aora*, Krøyer. Genus 19. *Eurystheus*:—"First gnathopod smaller than the second. Upper antenna with secondary appendage. Telson cylindrical;" recognised later by Spence Bate as belonging to a special division of the genus *Gammarus* which Liljeborg established; but the fact was not recognised, as Boeck points out, that to this division Liljeborg gave the name *Gammaropsis*, which therefore supersedes *Eurystheus*. Genus 20. *Gammarella*:—"Antennæ like *Gammarus*, and upper with secondary appendage. Last pair of pleopoda with a single branch. Telson single." Genus 25. *Thersites*:—"Upper antenna with second joint of peduncle produced from the inferior side of the first. Second gnathopod terminating in a brush. Telson double;" afterwards recognised as identical with *Bathyporeia*, Lindström.

"Family III. Corophiidæ. With the segments of the pleon not fused together." Subfamily I. Podocerides:—"The peduncle of the upper antenna much shorter than that of the lower. Lower antenna very strong, and used in climbing. Last pair of pleopoda terminating in short strong hooks." Genus 1. *Pleonexes*:—"Upper antenna without secondary appendage. Peduncle of the lower antenna reaching nearly to the extremity of the upper antenna. The gnathopoda subcheliform. Posterior pereiopoda prehensile." Afterwards referred to *Amphithoë*, Leach. Genus 3. *Sunamphitoë*:—"Second gnathopod larger than the first. Posterior pleopoda with one branch squamiform, the other terminating in two hooks. Telson terminating in a single strong hook." This is doubtless the same as Templeton's *Anisopus*, but the name *Anisopus*, being pre-occupied, must yield to *Sunamphithoë*.

"Family VIII. Dyopedidæ. The last segment of the pereion and the last of the pleon absent. Coxæ of last two pereiopoda fused with the body of the animal." Genus 1. *Dyopedos*:—"The *sixth* and *seventh* pairs of legs attached to the *sixth* segment of the pereion, The last pair of pleopoda absent. Telson single." This was afterwards found to coincide with *Dulichia*, Krøyer, and Dana's name Dulichidæ was therefore accepted for the family.

1857. Bate, C. Spence.

British Amphipoda. Annals and Magazine of Natural History. Vol. XIX. 2d Ser. London, 1857. p. 271.

In a letter dated February 16, 1857, Mr. Spence Bate says "having had an opportunity, since the publication of the synopsis of the British Amphipoda, of comparing the necessary works at the British Museum, I am enabled to make the following corrections and addenda:— After *O. littorea* read (Leach). After *O. Deshayesii* read (Savigny). *Acanthomatus Owenii* (mihi) is *A. testudo* of (Montagu). *Thersites* (mihi) must yield to *Bathyporea* (Lindström), and probably the species *B. Guilliamsonia* is the *pilosa* of that naturalist. *Leucothoë procera* (mihi) is probably *furina* of Savigny; and also the genus *Dyopedos* (mihi) is *Dulichia* of Kröyer; consequently the family *Dyopedidæ* will for the future be changed to *Dulichiadæ*."

1857. Bate, C. Spence.

British Edriophthalma. The Annals and Magazine of Natural History. Vol. XX. 2d Series. London, 1857. pp. 524–5.

He here divides *Talitrus* "into two genera, as has been done by Nicolet and Stimpson," adopts *Orchestoidea*, Nicolet, which is synonymous with *Megalorchestia*, Stimpson, thus producing the classification, *Talitrus*, *Orchestoidea*, *Talorchestia*, *Orchestia*. "*Lysianassa Chausica* in the synopsis (not Edwards's) is evidently *L. longicornis* of Lucas (Exped. to Algiers)." "The genus *Tetromatus*, mihi, *Pseudophthalmus*, Stimpson, is synonymous with *Ampelisca* of Kröyer." Hence, he says, the subfamily *Tetromatides* should be re-named *Ampeliscades*. *Pontoporeides* is given up as name of a subfamily, because *Pontoporeia* of Kröyer must go to the "*Lysiassides*." *Phoxides* is proposed as subfamily for *Phoxus*, etc. "*Phoxus Krüyerii*, mihi, will be changed into *P. simplex*," the other name being pre-occupied. "After *P. Holbölli*, read *Kröyer* instead of *mihi*" in the synopsis. "The genus *Lonchomerus* is evidently that of *Lalasia* of Lucas (Exped. to Algiers)." "There is to be added to the genus *Siphonocetus* of Kröyer the species *Cerapus Whitei* of Gosse; this may probably be synonymous with *S. Krüyeranus*, mihi." "*Cyamus* gracilis (Gosse) should have been *C. Thomsoni*, Gosse." There are also two or three other notes about names of species.

1857. Bate, C. Spence.

On a new Amphipod. *Iphimedia Eblanæ*. Dublin Natural History Society. pp. 58–59. Pl. XVI. Fig. 1–7. October, 1857. The Natural History Review. Vol. IV. London, Dublin, 1857. pp. 229–230. Pl. 16. fig. 1.

This species is in my opinion but doubtfully distinct from *Iphimedia obesa*, Rathke, the variations being perhaps only due to age or sex.

1857. Costa, Achille.

Ricerche sui crostacei Amfipodi del regno di Napoli. Memorie della Reale Accademia de Scienze di Napoli. Vol. I. Napoli, 1857. pp. 165–235. Tav. I.–IV.

The introduction briefly reviews the progress of knowledge in regard to the Amphipoda since 1830, and gives an account of the results at which Costa had himself arrived.

He classifies the "Amfipodi genuini" in this way:—Fam. I. Gammaridei. Subfam. I. Ampeliscini. Genera *Ampelisca. Araneops.* Subfam. II. Talitrini. Genera, *Orchestia, Talitrus.* Subfam. III. Lisianassini. Genera, *Lysianassa, Callisoma, Ichnopus, Alibrotus, Phlias, Acanthonotus.* Subfam. IV. Gammarini. Genera, *Egidia, Melita, Amphithoe, Amphithonotus, Nototropis, Epimeria, Probolium, Gammarus, Ceradocus, Elasmopus.* Subfam. V. Leucotoini. Genus, *Leucothoe.* Fam. II. Podoceridei. Subfam. VI. Podocerini. Genera, *Erichthonius, Cerapodina, Cerapus, Podocerus.* Subfam. VII. Unciolini. Genera, *Microdeutopus, Uncida.* Subfam. VIII. Corophiini. Genus, *Corophium.* To illustrate the incompleteness of this classification, he notices that he has forthwith to add two other genera, "*Pontoporeja*," Kroyer, and "*Bathyporeja*," Lindstrom.

Of his new genus *Araneops*, he gives the following description:—"*Caput elongato-conicum. Ocelli quatuor in capitis margine antico positi. Antennæ superiores uniseta; inferiores longiores, pone illas insertæ. Epimera quatuor anteriora infra valde producta, media angustiora. Pedes primi et secundi paris subæquales, prehensiles, ungue intus serrato; tertii et quarti cylindracei, ungue longo, articulum antepenultimum, ultimis duobus simul valde majorem, apice attingente. Pedes quinti, sexti* [*sexti*] *et septimi paris articulo primo valde elato, laminari.*" He recognises its close affinity with *Ampelisca*, Kroyer, of which it is in fact a synonym. The type species, *Araneops diadema*, Tav. i. fig. 1, is set down by Sp. Bate, Heller, and J. V. Carus, as a synonym of "*Ampelisca Guimardii*," Kroyer, by Boeck as a synonym of *Ampelisca tenuicornis*, Lilljeborg, 1855. Costa's second species, *Araneops brevicornis*, Tav. i. fig. 2, is by Carus named *Ampelisca brevicornis* (Marion), but by Boeck made a synonym of *Ampelisca macrocephala*, Lilljeborg, 1852.

After mentioning *Orchestia littorea*, Costa describes his species *Orchestia mediterranea*, and *Orchestia constricta*, the latter of which Heller identifies with "*Orchestia Montagui*," Aud.

Of *Lysianassa*, Costa describes and figures his three species, 1. *Lysianassa spinicornis*, Tav. I, fig. 4, a species not to be confused with *Lysianassa* (*Ichnopus*) *spinicornis*, Lilljeborg, 1865; 2. *Lysianassa loricata*; 3. *Lysianassa humilis*, which Heller thinks may be the same as "*Lysianassa Costæ*," M.-Edw., which Costa mentions as being found with it.

Callisoma punctatum, Costa, and *Callisoma hopei*, A. Costa, are mentioned, but as nothing is said of *Callisoma barthelemyi*, Hope, it may be presumed that Costa had ceased to consider it a distinct species.

The genus *Ichnopus*, evidently by the derivation intended to be *Ischnopus*, is thus defined:—

"*Antennæ longæ, graciles, superiores bisetæ. Pedes quatuor anteriores longi, graciles, filiformes, haud prehensiles, primi unguiculo minuto infra pectinato terminati; secundi submembranacei, manu apice longe fimbriata, unguiculo vix conspicuo.*" From *Callisoma*, which it resembles in the gnathopods, it differs, he says, in the antennæ, while from *Alibrotus*, which it resembles in the antennæ, it differs in the gnathopods. He adds, "è in questo genere che abbiam trovate quelle appendici simili alle branchie de' decapodi, inserite all'origine de' piedi toracici in forma piramidale, con uno stelo mediano, ed una serie di lamine da cadaun lato, accollate le une alle altre, e decrescenti dalla base all' estremità, che rappresenta l'apice della piramide." For this form of the branchiæ, see also Grube's account, 1866, of his *Lysianassa longicornis* ♀, (which is probably Costa's *Ichnopus taurus*), and Boeck's remark, De Sk. og arkt. Amph. p. 323, that it is especially characteristic for many species of the genus *Atylus*, that, like *Ichnopus*, their branchiæ have "en ophoist Ribbe langs Midten, hvorfra der udgaar talrige Folder som Sideribbe i et Blad." I have called attention to a similar structure also in *Byblis kallarthros* from Singapore. The type species of Costa's genus, *Ichnopus taurus*, is figured Tav. i. fig. 3.

The genus *Egidia* is thus defined:—

"*Antennæ superiores bisetæ; inferiores articulo primo inermi. Pedes quatuor anteriores minuti, prehensiles, subæquales; tertii paris articulo ultimo spatuliformi; quarti compressi, valde*

elati, articulo ultimo tantum teveti ; reliqui simplices." This genus is not noticed in the Brit. Mus. Catal. Boeck points out that it is a synonym of Dana's genus *Urothoë*, 1852, which, he says, "can better be seen from Costa's drawing of *Egidia pulchella* than from his description." The type species, *Egidia pulchella*, is figured Tav. iv. fig. 3.

Of *Melita*, Leach, a fresh definition is given, and *Melita palmata*, Montagu, is figured, Tav. ii. fig. 4.

The genus *Nototropis* is thus defined :—

"*Antennæ superiores unisetæ. Pedes quatuor anteriores prehensiles, filiformes, subæquales. Corpus valde compressum, dorso acute carinatum, sæpius segmentis aliquot in spinum productis ; epimeris mediæ magnitudinis.*" Spence Bate, Heller and Boeck make this a synonym of *Atylus*, Leach, and Costa's two species, *Nototropis guttatus*, Tav. i. fig. 7, and *Nototropis spinulicauda*, Tav. i. fig. 8, are both united by Heller under the name "*Atylus Costæ.*" As Costa identifies *Nototropis guttatus* with "*Acanthonotus guttatus*, A. Cost. in Hop. Cat. p. 46," the specific name *guttatus* must obviously take precedence of Heller's specific name "*Costæ*," which will enter into the synonymy, along with *spinulicauda*, if, as seems probable, that is not a distinct species.

The genus *Amphithonotus* is thus defined :—

"*Corpus modice compressum, dorso capitis thoracisque rotundato, abdominis carinato, segmentis pluribus abdominis, aut etiam ultimis thoracis postice spinosis. Antennæ superiores unisetæ. Pedes quatuor anteriores prehensiles, filiformes, subæquales.*" This genus, already briefly characterized in Hope's Catalogue, 1851, is a synonym of *Dexamine*, Leach, and the species *Amphithonotus acanthophthalmus*, which, together with *Amphithoe marionis*, Edw., Costa here places in the synonymy of *Amphithonotus marionis*, is by Boeck identified without doubt with *Dexamine spinosa*. The remaining species, *Amphithonotus spiniventris*, Tav. ii. fig. 1, is likewise by Grube and Boeck assigned to the genus *Dexamine*.

The genus *Epimeria*, already instituted in 1851, is here more fully defined :—

"*Antennæ superiores unisetæ. Pedes quatuor anteriores prehensiles, filiformes, subæquales. Corpus dorso in postica thoracis parte ac in abdomine carinatum et spinosum. Epimera quarti et quinti articuli thoracis maxima, simul clypeum semilunare formantia. Abdomen lamina horizontali terminatum.*" The type species, *Epimeria tricristata*, Tav. ii, fig. 2, is identified by Bate and Westwood, ii, p. 528, and by Boeck, with *Gammarus corniger*, Fabricius, so that it becomes *Epimeria cornigera*, Fabr.

The genus *Probolium* is thus defined :—

"*Antennæ superiores unisetæ. Pedes quatuor anteriores prehensiles, primi minores, secundi valde majores, manu maxima. Corpus dorso rotundatum inerme, utrinque loricatum, lorica ex epimeris tertii et quarti articuli connatis præcipue constituta.*" The type species is *Probolium polyprion*, Tav. ii. fig. 3 (not 5), which Boeck found, upon examination, to be without mandibular-palp. The genus he was accordingly able to identify with *Stenothoë*, Dana, 1852. The second gnathopods in *Stenothoë polyprion* have a remarkable likeness to those of *Microprotopus maculatus*, Norman.

Under *Amphithoe*, Leach, Costa places several species ; Section A, 1. "*Amphithoe Prevostii,*" M.-Edw., which is rather to be called *Hyale prevostii* ; 2. *Amphithoe babirussa*, A. Costa, Tav. ii, fig. 5, called *Allorchestes Babicus* in the Brit. Mus. Catal.; 3. *Amphithoe gazella*, Tav. ii, fig. 6 ; 4. *Amphithoe aquilina*, Tav. ii, fig. 7 ; 5. *Amphithoe tenella*, Tav. ii, fig. 8, which, with the two preceding species, may be called *Hyale gazella*, Costa himself noticing that *aquilina* is intermediate between the other two ; in Section A*a*, 6. *Amphithoe inæquipes*, Tav. ii, fig. 10, already established in 1851 ; 7. "*Amphithoe Pausylipi,*" a change in the spelling of "*Amphitoe Pausilipæ*," M.-Edw., 1830 ; 8. *Amphithoe crassicornis*, Tav. iii, fig. 1 ; 9. *Amphithoe penicillata*, Tav. ii, fig. 9, which is probably a synonym of "*Amphithoe Vaillantii,*" Lucas, 1849 (see Note on Catta, 1876); 10. *Amphithoe gracilis*, Tav. iii, fig. 4 ;

11. *Amphithoe elongata*, Tav. iii, fig. 5; 12. *Amphithoe micrura*, Tav. iii, fig. 2, referred by Spence Bate to *Pherusa fucicola*, Leach; in agreement with Costa's own suggestion; 13. *Amphithoe semicarinata*, Tav. iii, fig. 3, identified by Heller with *Gammarella brevicaudata*, M.-Edw., Costa himself suggesting that it may be the female of his own *Gammarus punctimanus*, for which see below.

The genus *Elasmopus* is thus defined:—

"*Antennæ superiores bisetæ; inferiores articulo primo inermi. Pedes quatuor anteriores prehensiles, secundi primis majores; sex postici elati, laminares, articulo ultimo tantum tereti.*"

By Spence Bate and J. V. Carus this is made a synonym of *Podocerus*, Leach, but Boeck points out that the cleft telson, the laminar branches of the third uropods and the large side-plates exclude that identification. The type species is *Elasmopus rapax*, Tav. IV. fig. 5.

In the genus *Gammarus*, Fab., Costa mentions numerous species; 1. *Gammarus locusta*, Fab.; 2. *Gammarus marinus*, Leach; 3. *Gammarus fluviatilis* (to which he gives the confused synonymy, "*Astacus fluviatilis*, Roes.—*Squilla pulex*, Deg.—*Gammarus Roeselii*, Gerv.—*Gammarus fluviatilis*, Edw."); 4. *Gammarus plumicornis*, Tav. IV. fig. 1; 5. "*Gammarus Olivii*," M.-Edw.; 6. *Gammarus pulex* (with the synonymy, *Cancer pulex?* Lin.—*Gammarus pulex*, Fab.—*Gammarus fluviatilis*, Edw. An. Sc. nat.—*Gammarus pulex*, Zenk., Edw. Suit. à Buff.," and the remark "Trovasi nelle acque dolei, al pari del *gamm. fluviatilis*"); 7. *Gammarus unguiserratus*, Tav. IV. fig. 2, accepted as a *Gammarus* by Sp. Bate and J. V. Carus, though the back "perfettamente liscio" does not agree with their definition of the genus, while by the upper antennæ much longer than the lower, the side-plates not very deep, and the three pairs of uropods reaching equally far back, it establishes a provisional claim to stand in the genus *Mæra* (Leach) Sp. Bate; 8. *Gammarus longicaudatus*, Tav. IV. fig. 6, already mentioned in Hope, Catal. p. 45, a species "trovato nelle acque potabili fluenti della città," apparently identical with *Niphargus aquilex*, Schiodte; 9. *Gammarus montanus*, Tav. IV. figs. 7, 8, also from Hope's Catalogue, "raccolto nel lago del Matese," and said to come very near the preceding species, but to differ essentially in the third uropods "notabilmente più corti, sorpassando di poco quelli del quarto [anello]; per modo che il primo articolo dell' appendice primaria è poco più lungo del peduncolo, ed il secondo è poco più della metà del primo," differences perhaps not of the highest importance (see Bate and Westwood, i. pp. 315, 317); 10. *Gammarus obtusunguis*, A. Cost. (n. sp.) Tav. III. fig. 8, referred by Heller to *Gammarella brevicaudata*, M.-Edw., as the male form, and so accepted by Carus on the authority of Sp. Bate, who however retains *Gammarus obtusunguis*, Costa; Heller's identification being indeed not a little doubtful from the great difference between the second gnathopods of Costa's form and those of *Gammarella brevicaudata*, ♂, as generally known; 11. *Gammarus scissimanus*, Tav. III. fig. 7, named by Heller *Mæra scissimana*, and clearly the same as *Amphithoe truncatipes*, Spinola, from Italy, mentioned in White's Catalogue, 1847, and afterwards described as *Mæra truncatipes* by Sp. Bate, in 1862, Costa's specific name *scissimanus* therefore taking precedence; 12. *Gammarus punctimanus*, Tav. III. fig. 6, referred by Heller, no doubt correctly, to the male of *Gammarella brevicaudata*, M.-Edw., the likeness to which is noticed by Costa himself; 13. *Gammarus bispinosus*, Tav. III. fig. 9. The Brit. Mus. Catal., p. 224, gives *Gammarus punctatus*, Costa, seemingly by mistake for *Gammarus punctimanus*, with the observation, "Costa says that it is nearly allied to *Gammarella brevicaudata*. It appears to me to be nearly allied to the genus *Melita*."

The genus *Ceradocus* is thus defined:—

"*Antennæ superiores bisetæ; inferiores processu trabeculiformi cuspidato, cum earum pedunculi articulo primo articulato anteaque porrecto prælitæ. Pedes quatuor anteriores prehensiles, secundi multo majores; sex postici articulo primo tantum dilatato.*" The process of the

lower antennæ, from which Costa derived the name, and, as he thought, the most striking peculiarity, of this genus, is rarely absent from the Gammarina. Spence Bate made the genus a synonym of *Melita*, Leach, Grube referred it to *Megamœra*, Spence Bate, and Heller to *Mœra*, Leach. The type species *Ceradocus orchestiipes*, Tav. iv. fig. 4, becomes *Mœra orchestiipes*.

In the genus *Leucothoë*, Leach, Costa describes *Leucothoe denticulata*, A. Costa, with a reference to "Fn. Nap. Tav. ix., fig. 3. (senza testo)," and the remark that it is "diversa dalla *L. furina* per le proporzioni degli articoli delle antenne, e pel margine unguicolare dell mani del secondo pajo fornito di dentelli più fini e tutti eguali." It has been identified with *Leucothoë spinicarpa*, Abildgaard, from which *Leucothoë furina*, Savigny, is only separated by subtle distinctions. Costa points out that his *Leucothoë parthenopæa*, in Hope's Catalogue, needs confirmation.

A fresh definition is given of *Eriethonius*, Milne-Edwards, in which genus Costa describes, 1. *Eriethonius difformis*, Milne-Edwards, *Mas*, and 2. *Eriethonius bidens*, A. Costa, Tav. iv. fig. 9, which J. V. Carus names *Cerapus bidens*, while Boeck makes it a synonym of *Cerapus abditus*, Templeton. S. I. Smith having shown that *Cerapus* is distinguished from *Eriethonius* by having the second uropods uniramous, the species assigned to either of these genera without description of the pleon are left in confusion. The peculiar form of the second gnathopods in the male seems to be common to both genera.

After mentioning *Podocerus calcaratus*, Rathke, Costa defines the genus *Microdentopus* as follows:—

"*Antennæ superiores seta multi articulata terminatæ; setaque accessoria rudimentali præditæ; inferiores pediformes. Pedes quatuor anteriores prehensiles; primi paris majores, in sexubus difformes, (mas) carpo maximo, manu parva, unguiculum gerente; (fem.) manu majore fere ut in g. Amphithoe: secundi minuti, filiformes.*" The type species is *Microdentopus gryllotalpa*, A. Costa, Tav. iv. fig. 10.

Corophium acherusicum, A. Costa, is not figured, but thus described:—"*Antennis superioribus brevioribus et gracilioribus: inferioribus corporis fere longitudine, validissimis, pedunculi articulo tertio infra ad apicem spinis duabus vel tribus decrescentibus armato (mas); brevioribus, minus crassis, inermibus (fem.); pedibus secundi paris ungue infra bidentato.*—Long. lin. 2." Boeck and Carus doubtfully identify this with *Corophium crassicorne*, Bruz.

In the "Amfipodi anomali," Costa gives *Vibilia speciosa*, A. Costa, and a reference to Fn. Nap. tav. ix. fig. 1 (senza testo). Carus gives as doubtful synonyms of "*Vibilia Jeangerardi*," Lucas, both this species and *Vibilia mediterranea*, Claus.

Hyperia pupa, A. Costa, Tav. iv. fig. 11, is thus described:—"*Pedibus quarti paris illos tertii paulo superantibus, quinti paris ceteris distincte longioribus; sexti et septimi decrescentibus: pedibus spuriis abdominalibus quintis quartis brevioribus, sextis pedunculo brevissimo, appendicibus valde inæqualibus, interna majori laminam apicalem paulo superante, externa augusta quarto breviore.*—Long. lin. 3½." Unfortunately only a gnathopod and part of the pleon are figured, but there is enough to show that this species does not belong to *Hyperia*, but more likely to a genus of the Lycæidæ.

Costa further mentions *Phrosina semilunata*, Risso, *Phronima sedentaria*, Forsk., and *Typhis oroides*, Risso.

1857. Huxley, Thomas Henry, born 1825 (Hagen).

Medical Times and Gazette. Vol. XXXVI. p. 467. 1857.

Bate and Westwood, vol. i. p. xvi, say that Professor Huxley here gives the name of *Endophragmal arch* to the long processes in the head of *Talitrus*, by which the stomach is supported in its position.

1857. Kirkby, J. W.

On some Permian Fossils *from* Durham, Plate VII. The Quarterly Journal of the Geological Society of London. Volume the Thirteenth, 1857. London. MDCCCLVII. pp. 213–216.

For a fossil from the Magnesian limestone of Durham, which Kirkby considers to be the same as *Trilobites problematicus*, Schlotheim, and *Palæocrangon problematica*, Schlauroth, he gives the name *Prosoponiscus problematicus*, deriving the new generic name "from πρόσωπον a face or mask, and ὀνίσκος, oniscus," as better expressing the affinities of the fossil. "In all," he says, "six specimens have been obtained; two from Humbleton Quarry, three from Field House, Ryhope, and one from Tunstall Hill." He does not say on what he relies for the generic characters, but describes the fossil as follows:—referring first to a specimen "showing the cephalic segment or carapace, with two body-segments attached (Pl. VII. figs. 1, 2, 3)."

"The carapace is about as long as four of the succeeding body-rings, somewhat less in depth, and slightly compressed laterally; it is carinated along the back and wedge-shaped in front; the eyes are large, round, and prominent, and are placed far forward; from the lower part of each eye runs an indented line, at a short distance from the margin, up to the dorsal region, where it curves forward.

"The other five specimens consist of body-rings (2 to 6 in number) and the two great posterior or caudal segments; and are very similar to the figures given by Schlauroth. In one of the Durham specimens (fig. 7) there are six body-rings, and two posterior segments; the others (figs. 4, 5, 6) have likewise the two latter segments, but not so many of the former. The body-segments are narrow, almost uniform in size, but varying a little in depth, the central ones appearing to be the most produced; they overlap each other and the penultimate segment posteriorly; they are slightly compressed, and have traces of a median dorsal ridge; those in front have their extremities turned a little forward, while the posterior ones are bent in the contrary direction. The large penultimate segment is greatly developed laterally; it is strongly carinated dorsally; its ventral margins are slightly convex, as is also the posterior border, which has a deep notch not far from the dorsal ridge; the ridge or keel of this segment is very prominent except anteriorly, where at each side of the dorsal ridge is a transverse swelling; it is compressed also posteriorly. The next segment, which is the hindermost known, is more compressed than the preceding one, and considerably smaller.

"None of the English specimens show the true external surface, nor have any traces of feet or of antennæ been found.

"The specimen with the carapace (figs. 1–3) is one-eighth of an inch long. The largest of those with the body-segments only (fig. 4) is nearly half an inch in length."

Since *Prosoponiscus* is no more appropriate to an Amphipod than *Palæocrangon*, it is obvious that Schlauroth's earlier name must take precedence.

1857. Leydig, Franz.

Lehrbuch der Histologie des Menschen und der Thiere. Frankfurt a/M. 1857.

Leydig in 1878 gives references to this work, pages 341, 342, 362, 441, with regard to the adipose body, the liver, and the circulation in *Gammarus*.

1857. Lindström, G.

Note on the Invertebrate Fauna of the Baltic Sea. By G. Lindström. The Annals and Magazine of Natural History. Number CXIV. pp. 496–497. Vol. XIX.—Second Series. London, 1857.

This is a good resumé of the account given by Lindström in 1855, Öfv. K. Vet.-Ak. Förh., pp. 49–73, of life at various depths in the Baltic. A reference for a like account is given to the "Bibliothèque Univ. de Genève, January 1857, p. 71."

1857. Lucas, Hippolyte.

Animaux nouveaux ou rares recueillis pendant l'expedition dans les parties centrales de l'Amérique du Sud, de Rio de Janeiro à Lima, et de Lima au Para; executée par ordre du gouvernement français pendant les années 1843 à 1847, sous la direction du comte Francis de Castelnau. Tome troisième. Entomologie par M. H. Lucas. Paris, 1857.

At page 13 he describes *Lysianassa magellanica*, with a reference to "*Ann. des sc. nat.*, 3e série, t. ix, p. 398," and figures it "de grandeur naturelle," pl. i. fig. 3. "Longueur, 70 millim., largeur, 31 millim."

1857. Reinhardt, J. Th., born 1816, died October 23, 1882 (Friedländer, Naturæ novitates). Schiødte, J. C.

Fortegnelse over Grønlands Krebsdyr, Annelider og Indvoldsorme af Professor J. Reinhardt. Grønland geographisk og statistisk beskrevet af H. Rink. Andet Bind. Kjøbenhavn, 1857. Naturhistoriske Tillæg Nr. 2. pp. 30–34.

Udsigt over Grønlands Land-, Ferskvands- og Strandbreds-Arthropoder, ved J. C. Schiødte. Tillæg Nr. 3. Amphipoda, p. 72.

Reinhardt gives the following list of Amphipoda:—"34. Orchestia.—Fn. gr. Nr. 235. Oniscus Stroemianus. *Grønl. Kingupek.* 35. Anonyx gulosus Kr. Nat. Tidssk. 2 R. 1, 611. ? Fn. gr. Nr. 233, Oniscus cicada. *Grønl. Kingungoak-aukpilartok.*" "36. Anonyx Holbøllii Kr." "37. Anonyx plautus Kr." "38. Anonyx Edwardsii Kr." "39. Anonyx minutus Kr." "40. Anonyx ampulla (Phipps)." "41. Anonyx Vahlii Rhdt. (sen.) Vid. Selsk. nat. math. Afh. vii, 233." 42. "Opis typica Kr." "43. Stegocephalus inflatus Kr." "44. Phoxus Holbøllii Kr." "45. Phoxus plumosus Kr." "46. Pontopareia femorata Kr." "47. Pardalisca cuspidata Kr." "48. Protomedeia fasciata Kr." "49. Ampelisca Eschrichtii Kr." "50. Photis Reinhardi Kr." "51. Acanthonotus inflatus Kr." "52. Acanthonotus serratus (Fbr.) Fn. gr. Nr. 237. Vid. Selsk. nat. math. Afh. VII, 266. Amphithoe serra Kr. *Grønl. Kingungoak-Kappinartalik.*" "53. Acanthonotus tricuspis Kr." "54. Acanthonotus cristatus Owen." "55. Amphithoe læviuscula Kr. Vid. Selsk. nat. math. Afh. VII, 281." "56. Amphithoe crenulata Kr. Vid. Selsk. nat. math. Afh. VII, 278. ♂. 275. ♀ inermis Rhdt sen. Nat. Tidsskr. IV, 165." "57. Amphithoe bicuspis Rhdt sen. Vid. Selsk. nat. math. Afh. VII, 273." "58. Amphithoe hystrix (Owen.) App. to the 2 Voy. of Sir J. Ross XCI. Vid. Selsk. nat. math. Afh. VII, 259." "59.

Amphithoe panopla Kr. Vid. Selsk. nat. math. Afh. VII, 270." "60. Amphithoe carinata Rhdt. sen. Vid. Selsk. nat. math. Afh. VII, 256." "61. Amphithoe Edwardsii (Sab.)." "62. Œdicceros saginatus. Kr." "63. Gammarus Sabini Leach." "64. Gammarus loricatus Sab." "65. Gammarus pinguis Kr. Vid. Selsk. nat. math. Afh. VII, 252." "66. Gammarus dentatus Kr." "67. Gammarus mutatus Liljeb. Vetensk. Akad. Hndl. 1853, S. 427. Fn. gr. Nr. 231. Oniscus pulex. ? Gam. locusta Mont. Trans. of the Linn. Soc. Vol. 9. p. 92, Tab. 4, Fig. 1. *Grønl. Kingak.*" "68. Gammarus?—? Fn. gr. Nr. 234. Oniscus arenarius. Vid. Selsk. nat. math. Afh. VII, 322." "69. Ischyrocerus anguipes Kr. Vid. Selskr. nat. math. Afh. VII, 283." "70. Ischyrocerus latipes Kr." "71. Leucothoe clypeata Kr." "72. Eusirus cuspidatus Kr." "73. Siphonocoetes typicus Kr." "74. Glauconome leucopis Kr." "75. Dulichia spinosissima Kr." "76. Metoecus Medusarum (Fbr.) Fn. gr. Nr. 232. Vid. Selsk. nat. math. Afh. VII, 288. *Grønl. Urksursak.*" "77. Temisto crassicornis Kr. Vid. Selsk. nat. math. Afh. VII, 295." "78. Lestrigonus exulans Kr. Vid. Selsk. nat. math. Afh. VII, 296." "79. Hyperia? Cyaneæ (Sab.)." "80. Hyperia oblivia Kr. Vid. Selsk. nat. math. Afh. VII, 298." "81. Cercops Holbøllii Kr." "82. Ægina longicornis Kr." "83. Caprella septentrionalis Kr. Nat. Tidsskr. IV, 590. Fn. gr. Nr. 225, Squilla lobata. *Grønl. Napparsariak.*" "84. Cyamus Ceti (Lin.*).[1] Fn. suec. Ed. alt. 1761. p. 499 Nr. 2056. Martens, Fr. Spitzb. o. Grønl. Reisebeschr., S. 86. & 109, Walfisches Lauss. ? Fn. gr. Nr. 230, Oniscus Ceti. ? Nat. Tidsskr. IV, 476, Cyamus Ceti. *Grønl. Arberub-koma.*" Lütken has made the investigation suggested in the note, and has named the parasite of the Krepokak *Cyamus boopis.*

Schiødte remarks upon the Amphipoda at page 72, "Den almindeligste grønlandske Tangloppe er ligesom paa vore Kyster *Gammarus locusta* Mont. (Oniscus pulex Fn. grønl. 231). Som en Art, der ogsaa undertiden stiger op i Tangen og ligeledes er aadselædende, naevner Fabricius en *Oniscus cirçala* n. 233), der af Krøyer ansees for at være en Anonyx og nærmest A. gulosus Kr. (Naturh. Tidsskr. N. R. I. 611); hvorledes den samler sig ved Blodet af en draebt Sælhund og om dens Krigsforhold til Gammarus locusta berettes p. 256 og 259. Som forekommende par Strandbreddene nævner Fabricius endnu to andre, ikke nærmere bekjendte Amphipoder, *Oniscus arenarius* n. 234 og *O. Strømianus* n. 235."

1857. SCHUR.

Systematisch Aufzählung der Crustaceen, Arachniden und Myriapoden welche ich bisher in der Umgebung von Trier aufgefunden habe. Jahresbericht der Gesellschaft für nützliche Forschungen zu Trier vom Jahre 1856. Trier, 1857. pp. 53–55.

He only mentions one Amphipod:—"Gammarus Pulex (Cane. pulex L.). In Quellen und Bächen; nicht selten."

1857. STIMPSON, WILLIAM.

On some Californian Crustacea. Proc. Californ. Acad. Nat. Sci. Vol. I. 1854–1857. (April 28, 1856). 2d Edition. San Francisco. 1873. pp. 95–99.

The species here described are "*Caprella Californica*," *Corophium spinicorne*, "*Orchestia Traskiana*," *Allorchestes seminuda*, *Mæra convexicola*, for all of which see next paper.

[1] "* Det turde fortjene en naermere Undersøgelse, om den af Fabricius og Prof. Krøyer beskrevne, paa Keporkaken (*Balænoptera boops*) levende *Cyamus* virkelig er samme Art som ægte *Cyamus Ceti Lin.* fra Grønlandshvalen."

1857. STIMPSON, WILLIAM.

The Crustacea and Echinodermata of the Pacific Shores of North America. [Extracted from the Journal of the Boston Society of Natural History, Vol. VI.] Riverside, Cambridge. 1857. 92 pages. Pl. xviii.–xxiii. Amphipoda, pp. 73–82.

Caprella californica is accepted somewhat doubtfully by Boeck. Mayer, without definitely uniting Boeck's species with Stimpson's, refers each to *? linearis* L. *Corophium spinicorne*, Stimpson, was apparently unknown to Spence Bate, as in the Brit. Mus. Catal. he makes a new *Corophium spinicorne*, which Boeck identifies with *Corophium crassicorne*, Bruzelius. *Corophium salmonis*, which Stimpson took, "not in a very good state of preservation," out of the stomach of a salmon, had almost better have been left there, instead of being drawn forth to create a very indistinct species. *Erichthonius rapax*, n. s., here described, is redescribed by Boeck in his Californian Amphipod-fauna, and transferred to the genus *Cerapus*, but if S. I. Smith's definition of the latter genus be accepted, Stimpson's name *Erichthonius rapax* must be restored, as the second uropods are biramous. *Orchestia scabripes*, Dana, is here referred to *Megalorchestia*, Brandt, which is superseded by the earlier *Orchestoidea*, Nicolet. *Megalorchestia californiana*, Brandt, is here distinguished from *Megalorchestia scabripes*, in common with which it is referred to the genus *Orchestoidea* in the Brit. Mus. Catal. *Orchestia californiensis*, Dana, 1854 [1856], is here mentioned, a species which does not appear in the Brit. Mus. Catal. *Orchestia traskiana* is described, and distinguished from two closely allied species, *Orchestia pugettensis*, and *Orchestia pickeringii*, Dana. *Allorchestes seminuda* is described and distinguished by minute characters from *Allorchestes pugettensis*, Dana. *Allorchestes plumulosus*, n. s., is distinguished from *Allorchestes seminuda* by characters doubtfully of specific value. Both species are described as common at San Francisco. Dana's species *Allorchestes angustus*, *Gammarus pugettensis*, and *Iphimedia pugettensis*, and Brandt's *Gammarus sitchensis* and *Gammarus atchensis* are recorded. Mœra confervicola, Stimpson, is renamed *Gammarus confervicolus*. It "differs from *G. Atchensis* in the smoothness of the dorsal surface of the first three abdominal segments." The last species described is *Phoxus gracilis*, n. s. Like several others from this paper, it is not recorded in the Brit. Mus. Catalogue. The description is as follows:—"This species is of a much larger size than is usual in the genus. Body broad and robust. Rostrum lamelliform, expanded over the bases of the superior antennæ, with a broadly rounded extremity. Superior antennæ bi-flagellate, the inner flagella very little smaller than the outer ones; both 12-articulate; penultimate article of peduncle entirely concealed beneath the rostrum. Inferior antennæ a little longer than the superior ones; terminal article of peduncle broad at its extremity where its outer angle is produced and rounded; its inner angle bearing the 15-articulate flagellum. Eye transversely oblong. Feet covered with simple hairs. Those of the first and second pairs with small subcheliform hands; those of the third and fourth pairs with the third and fourth articles dilated, the fifth slender, the sixth very small. Feet of the posterior three pairs very much widened; those of the sixth pair largest. Caudal stylets of the first and second pairs with short styliform rami, the inner ones being a little shorter than the outer ones; those of the third pair with long, flattened, equal rami, the outer ones spinulose along their outer edges, both fringed with long setæ on the inner sides. Terminal caudal spines of considerable length. The color is yellowish-white. Length, half an inch. It was dredged on a sandy bottom in ten fathoms, in the channel near the entrance of San Francisco Bay."

1857. Valette St. George, Adolphe Jean Hubert, Baron de la, born November 14, 1831 (Valette).

De Gammaro puteano. Dissertatio inauguralis. Accedunt duæ tabulæ æri incisæ. Berolini, 1857. pp. 5–16.

The *Gammarus puteanus*, Koch, of this dissertation is referred by Bate and Westwood to *Niphargus aquilex*, Schiodte. La Valette gives numerous measurements of the animal at different ages and in both sexes, as well as of various parts of it. The statement of Hosius that the third joint of the mandible-palp in all Gammari ends in an incurved nail will not, he says, apply to *Gammarus puteanus*. He never found more than two articulations in the secondary flagellum of the antennæ. In the very short, leaf-like branch of the third uropods, he could not find the plumose seta described by Caspary, though he found, as Caspary had done, several setæ on the long two-jointed branch. He corrects some oversights committed by Milne-Edwards and Hosius in regard to the telson, and denies the statement of Caspary that the first peræon-segment carries branchiæ, and of Hosius that all the feet but the first are furnished with them, there being in fact only five pairs.

He reckons 12 ganglia in the nerve-chain; refers doubtfully to the cone at the base of the 2d antennæ as subservient to the sense of hearing; describes the organs on the antennæ since known as "calceoli," questioning whether they may be olfactory organs, and remarking by the way that their size increases towards the end of the antennæ, which, however, I may say, is certainly not the case in all Amphipods. He describes the œsophagus, stomach and intestinal canal, mentions the liver-tubes as having been already observed by Siebold and Leydig in *Gammarus pulex*, and further states that the intestinal canal about the beginning of the fourth pleon-segment sends forth two cæcal tubes directed forwards. He thinks that these may have a renal function, but cannot decide the question, not having succeeded in obtaining evidence of the presence of uric acid. Together with other anatomical observations he notices that the heart has three pairs of lateral valves for the introduction of the venous blood, situated in the second, third, and fourth peræon-segments. For his priority in this observation, Delage by an oversight has omitted to give him his due credit.

1857. White, Adam.

A popular history of British Crustacea; comprising a familiar account of their classification and habits. London, 1857.

In the preface White says, "the general arrangement is that of the classical 'Histoire Naturelle des Crustacés,' by Professor Milne-Edwards. Among the *Amphipoda*, I have been chiefly guided by Mr. Spence Bate's synopsis, published in the February number of the 'Annals and Magazine of Natural History.'" Of the "Division Edriophthalma, *Leach*," the two Orders, Amphipoda and Læmodipoda, occupy from page 158 to page 220.

Of *Talitrus locusta* he says, "it is to this species Archdeacon Paley alludes in the 26th chapter of his 'Natural Theology,' as an instance of the abundance of happiness in the lower creatures." The notion appears to be that as children skip when they are in good spirits, the skipping of Talitri must be due to mental emotion rather than the structure of their tails. Mr. Halliday's observation, Ent. Mag. iv. 252, is cited, that a small beetle, *Cillenum laterale*, feeds on this sandhopper.

On plate x., which is due to Mr. Spence Bate, there is figured *Orchestia littorea*, var., which Spence Bate subsequently identified both with his own *Orchestia lævis*, and the earlier *Orchestia mediterranea*, Costa.

As first genus in the family Gammaridæ, *Opis*, Krøyer, is here mentioned, on account of a species from Ireland, said to be *Opis typica*, which does not appear in the Synopsis. "Montagua monoculoides, Montagu, sp.," is figured. In the genus *Anonyx*, is introduced, besides the species of the Synopsis, "*Anonyx albus*. A small species, of a white colour; has been found at Clevedon, in Somersetshire, by the Rev. A. Norman. It is perhaps to this genus that the *Gammarus nolens*, Johnston, Zool. Journ. iii. p. 179, may be referred; it is about three or four lines long; the antennæ have a whorl of short spines at each joint; the arms and legs are monodactyle. It is found at Berwick amongst confervæ." *Anonyx elegans*, Thompson, another species not mentioned in the Synopsis, likewise appears here. "*Anonyx Edwardsii*," is figured as Krøyer's, on the authority of Spence Bate, but wrongly according to Boeck, 1870, and Sars, 1882. *Tetromatus typicus*, Spence Bate, is figured.

White notes that the name *Westwoodia* is pre-occupied among Hymenopterous insects. *Iphimedia obesa*, Rathke, is figured, pl. x. fig. 6. "*Acanthonotus Owenii*" of the Synopsis is here given as *Acanthonotus testudo*; the name which White himself gave to the species afterwards known as *Epimeria corniyera*, Fabr. After describing *Dexamine spinosa*, figured pl. x. fig. 7, White says, "to the genus *Dexamine* belongs the *Cancer carino-spinosus*, Turton, which Mr. Spence Bate has more fully described under the name *Gammarus Moggridgei*." In regard to Bate's "*Lembos Websterii*," which has "first hand with a thumb on propodos," and his "*Lembos Dannoniensis*," which has "first hand with a thumb on carpus," he merely says, "Mr. Bate has described two other species from the south of England—*L. Websterii* and *L. Dannoniensis*—both furnished with a thumb on the first hand," as though it was indifferent whether the thumb was on carpus or propodos.

He omits, not without reason, the description in the Synopsis of *Gammarus pulex*, Fabr., borrowed from Milne-Edwards. He also omits the "*G. ? subterraneus*, Leach," and accepts *Gammarus maculatus*, Johnston, without hesitation.

The "*Niphargus Stygius*," of Westwood, he changes into *Niphargus aquilex*, Schioedte, and asks whether this may not be the *Gammarus subterraneus* of Leach.

He notices under *Bathyporeia*, Lindst., that "Mr. Spence Bate now refers his genus *Thersites* to this, and the species *T. Guilliamsoniana* to *Bathyporeia pilosa*."

Leucothoe procera, Spence Bate, at its author's own instigation, is identified with *Leucothoe furina*, Savigny.

Some account is given from Say of *Cerapus tubularis*, though not a British species, to introduce an account from Gosse of his *Cerapus whitei*. D'Orbigny's account of *Corophium longicorne*, figured pl. xi. fig. 1, is quoted from, and mention made that Gosse had taken *Unciola irrorata*, Say, in our seas.

Jassa pelagica, Leach, figured pl. x. fig. 8, and *Jassa falcata*, Montagu, are given, with a notice that "Mr. Spence Bate believes that this genus [*Jassa*] is founded merely on females of the preceding" [*Podocerus*], and the further remark that "it is perhaps to this genus [*Jassa*] that the *Gammarus spinipes* of Dr. Johnston is referable (Zool. Journ. iv. p. 417)."

Under *Amphithoe*, Leach, besides the species assigned in the Synopsis to *Amphitoë*, Leach, White gives "*Amphithoe obtusata*, Leach's Coast Screw," which is Montagu's species, both before and since known as *Melita obtusata*. He also gives *Amphithoe dubia*, evidently as the name of Johnston's *Gammarus dubius* from Berwick, and therefore not to be confounded with *Amphithoe dubia* of the Brit. Mus. Catal., which is the *Anisopus dubius* of Templeton.

The name *Sunamphitoë* is altered to *Synamphithoe*, obviously on philological grounds.

Chelura terebrans, Philippi, is figured pl. xi. fig. 2. Allman's remarks on its habits are quoted.

The "Tribe HYPERITA" is then described as follows:—"Head very large. Mandibles large, generally ending in crests rather than teeth. First pair of jaws, of three joints, the two last lamellar, the thorax of six or seven joints; some of the legs prehensile and of curious

form ; end of abdomen adapted for swimming but not for leaping. The species of this tribe are more or less parasitic, some of them being attached to Fishes, and others to Medusæ." The "Fam. Phronimadæ," and "Fam. DULICHIADÆ, *Spence Bate*," are placed in this tribe. To the Phronimadæ he assigns 1. *Hyperia*, with the species "*Latreillii*," Milne-Edwards, figured plate xi. fig. 3, and *oblivia*, Milne-Edwards, remarking that Spence Bate regards "Hyperia Latreillii" as synonymous with "C. Gammarus Galba" of Montagu ; 2. *Metoecus*, Krøyer, with the species "*Metoecus Medusarum*, O. Fabr., sp.," as described by Gosse ; 3. *Phronima*, with the species *sedentaria*, figured pl. xi. fig. 4, the account of which is followed by the remark, "We have apparently in the British Islands more than one species of the family *Typhidæ* : they are not well made out. The antennæ in this family are inserted on the lower part of the head, and are folded three or four times on each other." This is no doubt added to explain the omission of *Typhis nolens*, Johnston, which is included in the Synopsis.

The "Fam. DYOPEDIDÆ" of the Synopsis, with the genus *Dyopedos*, Spence Bate, and the two species *Dyopedos porrectus* and *Dyopedos falcatus* here become on Spence Bate's authority "Fam. DULICHIADÆ, *Spence Bate*," Gen. *Dulichia*, Krøyer, species, *Dulichia porrecta*, Spence Bate, and *Dulichia porrecta*, Spence Bate.

Of "Order II. LÆMODIPODA," White remarks that "Mr. Spence Bate merges this Order in *Amphipoda*." Several of Gosse's observations on the shape and habits of *Caprella* are quoted. The arrangement, not of the Synopsis, but of White's own Catalogue of British Crustacea, 1850, is here followed. *Caprella tuberculata*, Goodsir, is figured pl. xi. fig. 5, a representation which, but for the size of the species, would suggest rather *Caprella acutifrons*, Latreille, than *Caprella tuberculata*, Bate and Westwood, or *Caprella linearis* (Linn.), Bate ; the figure appears to have been copied on a reduced scale from Goodsir, with the line indicating the natural size reduced to match ! *Caprella lobata*, Müller, of the Catalogue, does not re-appear. *Caprella spinosa*, Goodsir, is added, and described as similar to *Caprella phasma*, Montagu, but differing "chiefly in the first thoracic segment having five spines." Its segments also, he says, are considerably longer, and adds that "Mr. Bate refers this with doubt to the genus *Protella* of Dana, and to the species named *Ægina longispina* by Krøyer." To *Proto* he adds the species "*Proto Goodsirii*," Spence Bate.

The "Fam. CYAMIDÆ" are thus described :—

"Body depressed, oval. Eyes compound ; two very small ocelli on vertex ; antennæ very close together at the base. Five pairs of legs, more or less prehensile ; second and third joints of the thorax without legs, but bearing very long cylindrical respiratory appendages, which are generally bent over the back. The species of this family are parasitic on the whale and dolphin. They gnaw the rough thick skin of these marine animals more or less deeply. There seem to be several species of *Cyamus*, attacking different parts of the bodies of these bulky beasts, some preferring the head and others the fins and other parts of the body."

"Gen. CYAMUS, *Latr.* Head small, truncated, united to first thoracic segment. The characters of the genus are those of the family.

"CYAMUS CETI, *Whale Louse* (Plate XI. fig. 6.)—Branchial appendages simple, and furnished at the base with two unequal and pointed upper edges. Under the fins, etc., of the whale.

"CYAMUS OVALIS.—Body much wider than in last, four pairs of branchial appendages in both sexes, those of third ring with a single short slender appendage at the base, those of the fourth ring with two of unequal length. Lives in clusters on the hard projections of head of whale.

"The *Cyamus gracilis* and *Cyamus Thompsoni* are also recorded as British ; the latter was found on a dolphin and is described by Mr. Gosse."

Savigny's mistake about the eyes is retained in the description of the family. The figure of *Cyamus ceti* is criticized by Lütken as not good. Lütken also thinks it quite unreasonable

that English authors should include Roussel's South Sea species, *Cyamus oralis* and *Cyamus gracilis*, in the English Fauna. Only on the supposition, he says, that the Cyamid parasites on the Southern Whale are possibly also to be found on the Basque Whale, could these species be included in the Fauna of Great Britain.

1858. Bate, C. Spence.

Description of Two Rare Crustaceans from the Coast of Durham, one of them a New Species. Transactions of the Tyneside Naturalists' Field Club. Volume IV. Part I. Newcastle-upon-Tyne, 1858. pp. 15–16. Pl. II.

Kroyera arenaria, Spence Bate, the new species, is thus described :—

"*Antennæ inferiores quam superiores sunt longiores. Gnathopoda secunda sunt cheliformes; carpi producuntur ultra dactylorum extremitates. Super regiones dorsales posteriores, nullæ dentes.*"

"This species differs from the one on which the genus was founded, chiefly in the absence of the carinated dorsal ridge, and in the peculiar form of the second *gnathopoda*. In *K. Carinata* they are subcheliform, but the *carpi* are produced so that they reach beyond the extremity of the fingers—a peculiarity I never saw in any other Crustacean." After further description, Mr. Spence Bate says, "this genus belongs to the subfamily *Phoxides*, the habits of which are not much known." If *Kroyera carinata*, the type species, be identified with *Monoculodes*, the name *Kroyera* would lapse as a synonym, and Boeck's *Pontocrates*, 1860, would take its place. On the other hand Spence Bate's specific name *arenaria* has precedence of Boeck's *norvegicus*, 1860, so that if Boeck is right in identifying his species with Bate's, the species becomes *Pontocrates arenarius*, Spence Bate, sp., with *Œdiceros norvegicus*, Boeck, 1860, and *Pontocrates norvegicus*, Boeck, 1870, for its synonyms. But for a different view see Note on J. S. Schneider, 1885.

The other species here mentioned is *Sulcator arenarius*, Spence Bate, properly *Haustorius arenarius*, Slabber, a species by no means rare.

1858. Bate, C. Spence.

On the nidification of Crustacea. The Annals and Magazine of Natural History, 3 Ser. Vol. 1. 1858. pp. 161–169, 317. Ann. Sci. Nat. ix. (Zool.) 1858. pp. 255–264. Trans. Plym. Inst. & Devon & Corn. N. H. Soc. 1858, pp. 1–9. Pl. I.

Interesting particulars are given in regard to the homes constructed in various ways by creatures belonging to the genera *Cerapus*, *Unciola*, *Siphonœcetes*, *Amphithoë*, *Podocerus*, *Corophium*, *Clelura* and *Phronima*. The connection between the animal's structure and the character of its dwelling, in regard to the *Podocerides*, *Corophiides* and *Clelura* respectively is pointed out. The nature of the habitation of *Phronima sedentaria* had not as yet been decisively made out.

1858. Bate, C. Spence.

On some new Genera and Species of Crustacea Amphipoda. The Annals and Magazine of Natural History. 3 Ser. Vol. I. May, 1858. pp. 361–362.

From the Collection of the Royal College of Surgeons are described the following :—

"Macrocephalus, n. g.

"*Cephalon* horizontaliter porrectum. *Antennæ* inferiores nullæ. Pedum *coxæ* corpore fusæ.

Pleopoda posteriora tria duplicatis partibus divisa. *Telson* cylindraceum. *Macrocephalus longirostris* n. s. *M. cephalo* perlonge rostrato (rostro corporis totius $\frac{2}{3}$ longitudinem æquante). *Antennis* superioribus rudimentariis. *Gnathopodis* primi et secundi parium chelatis. *Carpis* dactylorum apice productis. Presented by Sir E. Belcher.

"Pleustes, n. g. *Cephalon* rostro productum. Antennæ superiores quam inferiores longiores. *Coxæ* anteriores quatuor permagnæ. *Gnathopoda* subæqualia et subcheliforme. *Pleopoda* posteriora in duplicatis partibus divisa. Telson squamiforme. *Pleustes tuberculata*, n. s. *P. pereii* segmentis omnibus, *plei* anterioribus duobus tuberculo dorsali medio ornatis. Pereii segmentis posterioribus tribus, *plei* omnibus lateraliter tuberculatis. Segmentis pereii omnibus, *plei* anterioribus duobus coxarum marginibus tuberculatis. Pereiopodis posterioribus tribus *coxis* tuberculatis. *Pleopodis* posterioribus appendice interiore permagno.

"*Amphitoë lacertosa*, n. s. Ut genus sed *gnathopodo* secundo permagno et chelato. Arctic regions.

"*Lysianassa bidenticulata*, n. s., *L. antennis* inferioribus superiores non superantibus. *Gnathopodis* paris primi *propodo carpo* longiore. *Gnathopodis* paris secundi *carpo propodo* longiore. *Plei* segmento tertio margine posteriori denticulis duobus utrinque producto."

In the Brit. Mus. Catal., Spence Bate identifies *Macrocephalus longirostris* with the earlier *Oxycephalus armatus*, M.-Edw., which had been made the type of the genus *Rhabdosoma* by Adams and White. *Pleustes tuberculata* is identified by Boeck with *Amphithoë panopla*, Kroyer, and as *Pleustes panoplus*, is accepted as type of the genus *Pleustes*. *Lysianassa bidenticulata*, in the Brit. Mus. Catal., becomes a synonym of *Lysianassa nugax*, but by Miers and G. O. Sars its right to specific distinction is vindicated. Sars names it *Socarnes bidenticulatus*, Bate.

1858. Bemmelen, A. A. van.

Bijdragen tot de Kennis onzer inlandsche Diernamen. (In Bowstoffen v. e. Fauna v. Nederl. II. bl. 132). 1858.

R. T. Maitland in 1875 includes this work in his list of authorities. In regard to *Orchestia littorea*, Leach, he refers to it for the remark that "Deze soort en Talitrus saltator worden aan onze stranden zee-luizen, zee-vlooien en strand-vlooien genoemd."

1858. Chenu, and Desmarest, E. (See under the date 1874.)

1858. Gerstfeldt, Georg.

Ueber einige zum Theil neue Arten Platoden, Anneliden, Myriapoden und Crustaceen Sibirien's, namentlich seines östlichen Theiles und des Amur-Gebietes. (Aus den *Mémoires des Savants étrangers T. VIII.* besonders abgedruckt.) St. Petersburg. 1858. pp. 20–31 (280–291), 35–36 (295–296).

The first species mentioned among the Amphipoda is *Gammarus pulex*, de Geer, which he considers to be as much at home in the whole of Siberia as in Europe, while "the *Gammarus* from the hot springs of Natschik in Kamtschatka, of which Brandt makes mention, stands at least very near it, if it be not quite identical." This comes under section α of the genus, in which "das Innenglied des 6. falschen Fusspaares ist so lang oder mindestens halb so lang als das äussere (Brandt)."

Section β, in which "das Innenglied des 6. falschen Fusspaares ist noch nicht oder höchstens ein Viertheil so lang als das äussere und oft nur rudimentär," contains the following :—

"Spec. 2. *Gammarus verrucosus*, mh. n. sp. Corpore lateraliter compresso; thorace et abdomine inermibus, segmentis postabdominalibus præsertim, secundo et tertio, tuberculis numerosis spinosis instructis; ramo stylorum caudalium posticorum externo longissimo, margine longe ciliato," found in the Angará at Irkutsk, with *Gammarus ochotensis*, Brandt, for its nearest relation. This species is partially described and figured in the Brit. Mus. Catal., but there by a misapprehension referred to "Brandt, Middendorff's Sibirische Reise." Spence Bate's description of the pleon includes a feature not alluded to by Gerstfeldt in the "infero-posterior angle of the third segment produced into a long upturned tooth." Dybowski, however, in his account and figure of the species, does not give this tooth or anything more than an ordinary angle to the segment in question.

Spec. 3. "*Gammarus Maackii*, mh. n. sp. Corpore lateraliter compresso, thorace et anteabdomine inermibus; segmentis postabdominalibus singulis duabus vel quatuor carinis spinosis armatis; ramo stylorum caudalium posticorum externo longissimo, margine breviter aculeato." It comes near to *Gammarus ochotensis*, Brandt, and is almost as common in the Angará at Irkutsk as *Gammarus verrucosus*. In the Brit. Mus. Catal., where it is figured, it is attributed to Brandt, instead of Gerstfeldt. It is redescribed by Dybowski in 1874, but not figured.

As distinguished from the foregoing species, in which "Die Rückenseite des 4. und 5. Schwanzgürtels erscheint mit Stacheln besetzt," in the followiug species the fourth and fifth pleon-segments are dorsally "stachellos."

"Spec. 4. *Gammarus cancellus*, Pallas," is described, with "tuberculorum (dorsalium) par quintum maximum." In 1862 Spence Bate took this as type of his new genus *Pallasea*. In 1874 Dybowski again describes it as *Gammarus cancellus*, Pallas, of which he describes and figures a variety named *Gerstfeldtii*."

"Spec. 5. *Gammarus cancelloides*, mh. n. sp.," from the Angará at Irkutsk, is thus described:—"Gammaro Cancello Pall. similis, tuberculis tamen dorsalibus minus elevatis; a capite ad caudam crescentibus, neque vero pari quinto, sed paribus octavo et nono maximis; in segmentis thoracis et anteabdominis carinarum lateralium loco tuberculis valde prominentibus." Spence Bate, in the Appendix to the Brit. Mus. Catal., inclines to regard this as a variety of *Pallasea cancellus*, but Dybowski retains it as a distinct species, *Gammarus cancelloides*, Gerstfeldt, of which he gives a description and figures.

"Spec. 6. *Gammarus latissimus*, mh. n. sp.," also from the Angará at Irkutsk is thus described:—"Corpore latissimo, fere onisciformi; fronte producto et quatuor paribus aculeorum, mediis duobus verrucis impositis, armato; segmentis thoracis et anteabdominis carinatis et tuberculo supra laminas laterales sita versus declivibus; segmentis postabdominalibus tuberculis lateralibus destitutis, anterioribus tribus tuberculis dorsalibus, quorum duo posteriora aculeata, præditis." As already explained, this species was subsequently under a misapprehension attributed to Brandt in the Brit. Mus. Catal., and is there made the type of a new genus *Brandtia*. Dybowski, who had not met with it in Lake Baikal, retains it under the name *Gammarus latissimus*, in 1874.

Among those *Gammari* in which "der Hinterrand des 3. Postabdominalsegmentes und meist auch derjenige der beiden vorhergehenden verlängert sich in der Mittellinie in Art eines Zahnes oder Stachels nach hinten," Gerstfeldt places "Spec. 7. *Gammarus kürgensis* mh. n. sp. Corpore lateraliter compresso, margine posteriore trium anteriorum segmentorum postabdominalium et interdum etiam nonnullorum aut omnium anteabdominis et thoracis in spinam acutam tenuemque segmento sequenti incumbentem producto," "aus einer Pfütze an der Kürga." This does not appear to be mentioned in the Brit. Mus. Catal. Nor does it appear in Dybowski's long list of species from Lake Baikal. The fuller description is as follows:—"Der Körper ist ziemlich stark seitlich zusammengedrückt; die Stirn bildet nur ein kurzes dreieckiges Spitzchen; die Augen sind oval-nierenförmig. Die nur schwach

behaarten Fühler haben etwa die halbe Länge des Körpers und von ihnen überragen die oberen mit ihrem letzten Drittheile die unteren; das Ende des Stieles der oberen Antennen reicht nur bis zum Anfange des letzten Stielgliedes der unteren oder wenig weiter; erstere besitzen an der Hauptgeissel 10–14, an der kleinen Nebengeissel, welche nur wenig länger ist als das erste Glied der Hauptgeissel, 2–3 Glieder; die Geissel der unteren Antennen übertrifft ihren Stiel kaum an Länge und besteht aus 4–5 Gliedern. Die vorderen Füsse sind mit Haaren, Wimpern und Stacheln besetzt. Die vorderen Hände sind kleiner als die hinteren, aber verhältnissmässig breiter, rhomboidal und am Vorderrande schräg abgestutzt, wogegen die hinteren grösser und namentlich länger und fast eiförmig erscheinen; bei beiden Paaren ist der Innenrand an der oberen Hälfte mit kleinen Zähnchen, an der unteren mit stachelartigen Borsten besetzt.—Der Hinterrand der drei ersten Schwanzsegmente und gleichzeitig zuweilen derselbe Rand aller oder einiger Brustbauchringe verlängert sich in der Mittellinie des Rückens in einen nach hinten gerichteten, feinen, spitzen, dornartigen Fortsatz, welcher dem nächstfolgenden hinteren Segmente aufliegt und nur bei gekrümmter Lage des Rückens sichtbar wird.—Das 4. und 5. mit Stacheln besetzte Afterfusspaar gehen etwas über das Ende des Körpers hinaus und das letzte falsche Fusspaar trägt auf ziemlich langem Basalgliede zwei am Rande mit Stacheln versehene, fast gleich lange Blättchen, die kürzer als die Basis erscheinen.—Die Seitenplatten der Körperringe vor der Basis der Füsse sind verhältnissmässig lang.—Die Farbung ist gelblich und die Länge des Körpers beträgt nur 2–2½‴.

"Von den Gammarus-Arten mit nach hinten verlängerten Rückenkielen der ersten Schwanzsegmente, von. *G. Sabinii* Leach, *G. loricatus* Sabine, *G. angulosus* Rathke, *G.* (*Amathia*) *carinatus* Rathke, *G. mucronatus* Say (*G. boreus* Sabine, Suppl. to the Appendix of Capt. Parry's first voy. cexxix. u. Ann. des sc. nat. 1830, xx, p. 368) etc. entfernt sich *Gamm. kürjensis* dadurch, dass er nur feine Stacheln, jene aber höhere zahnförmige Rückenkämme besitzen. Näher scheint ihm in dieser Beziehung *G. albidus* Dana (Unit. Stat. expl. exped. Crust. II., 948 u. Atlas Tab. 65, fig. 4) von Tongatabu zu stehen."

The principal divisions of the genus *Gammarus* here adopted by Gerstfeldt are taken from Milne-Edwards' Hist. nat. des Crustacés.

1858. Hancock, Albany, born 1806, died October 24, 1873 (R. Howse).

Remarks on certain Vermiform Fossils found in the Mountain Limestone Districts of the North of England. Annals and Magazine of Natural History. Ser. 3. Vol. II. December 1858. pp. 443–457. Pl. XIV.–XIX. (Read at the British Association Meeting, Leeds, September 22, 1858). Also in Transactions of the Tyneside Naturalists' Field Club. Vol. IV. Part I. Newcastle-upon-Tyne, 1858. pp. 17–33, Pls. III. IV.

The fossil marks are explained by comparison with those which Crustaceans make at present. The tracks or runs of *Sulcator arenarius* are carefully described and figured. On sandy shores upon the north-east coast of England, "they are to be seen," Mr. Hancock says, "everywhere between tide-marks, but are most numerous about half-way down the beach, on inclined, oozy, glistening spots, where the sand is firm, and yet the moisture so profuse that it mirrors the light." The phenomenon is far from being confined to the north-east coast; it was moreover noticed by Say in his account of *Lepidactylis*, in 1818. Besides the tunnelling of *Sulcator arenarius*, the surface track of *Kröyera arenaria* is likewise described and figured. It is curious that no mention should be made of the species which, so far as my experience goes, is much commoner than *Kröyera arenaria* in the situations

described, namely, *Bathyporeia pilosa*, which leaves its little labyrinthine tracks, and sometimes short straight ones, in vast numbers over such stretches of sand as Mr. Hancock describes. In regard to the species *Sulcator arenarius* and *Krøyera arenaria*, see Notes on Sp. Bate, 1851, 1857, and 1858.

1858. Saussure, Henri F. de.

Mémoire sur divers crustacés nouveaux des Antilles et du Mexique. Mém. de la Société de Physique et d'Histoire naturelle de Genève. Tom. XIV. P. 2. Genève 1858. pp. 417–496. Ordre des Amphipodes, pp. 474–475. Fig. 33.

The new species described is called *Amphitoe asteeus*. "*Habite:* Le Mexique; pris en abondance dans une citerne de Vera Cruz." W. Faxon says, "After an examination of a large number of *Hyalella dentata* and *H. inermis* from Utah, I am satisfied that they are but varieties of one species. The form with dorsal teeth on the first and second abdominal segments is very probably synonymous with *Amphitoe azteeus* Saussure and *Allorchestes Knickerbockeri* Bate, as pointed out by Professor Smith himself." *Hyalella azteca* will therefore, in my opinion, be the best name for Saussure's species.

1859. Bate, C. Spence.

On the fossil Crustacean found in the magnesian limestone of Durham, and on a new species of Amphipod (1858). Quart. Journ. Geol. Soc., Vol. XV. 1859. pp. 137–140, Pl. VI. figs. 1–8. Nat. Hist. Review. VI. 1859 (Proc.) pp. 163–166.

The fossil Crustacean is that supposed to be identical with the *Trilobites problematicus* of Schlotheim and by Schlauroth named *Palæocrangon problematicus*, which Kirkby changed into *Prosoponiscus problematicus*, thus far the only British fossil Amphipod. See Notes on H. Woodward, 1871 and 1877.

The new Amphipod is *Phædra antiqua*, founded on a damaged specimen, which closely agreed with the fossil fragments. The new genus *Phædra* is thus defined in the Brit. Sess. Crust., vol. i. p. 208 :—

Phædra :—" Cephalon produced anteriorly. Segments of the pereion short, of the pleon long. Superior antennæ shorter than the inferior, furnished with a secondary appendage. Posterior pair of pleopoda considerably elongated, biramous. Telson simple or notched."

1859. Bate, C. Spence.

On the genus *Niphargus*, Schiödte. Dublin Univ. Zool. and Bot. Assoc. Proc. I. 1859. pp. 237–240. Figs. 1–4.

After a discussion of earlier notices of well-shrimps, the new species *Niphargus fontanus* and *Niphargus kochianus* are figured and described, a new genus *Crangonyx* is instituted, with the species, *Crangonyx subterraneus*, to the description of which is appended the remark, "it is not improbable that this may be the *Gammarus subterraneus* of Leach; but we have no means of ascertaining."

The name *Crangonyx* is derived from κραγγών and νύξ.

The genus is thus defined :—" Like Gammarus, but not having fasciculi of spines upon the

posterior segments of the pleon, and having the posterior pair of pleopoda unibranched. Telson single."

De Rougemont is inclined to unite all these three species under *Gammarus puteanus*, Koch. The matter perhaps is not yet ripe for final determination.

1859? Bruzelius, Ragnar Magnus, born 1832.

Bidrag till kännedomen om skandinaviens Amphipoda Gammaridea. Med Tafflorna I.–IV. Till k. vet. akad. inlemnad d. 17 mars 1858. K. Svenska Vetenskaps Akademiens Handlingar, 3:dje Bandet N:o 1. (1859–60). Stockholm, 1862. pp. 1–104.

In a brief notice of earlier classifications, Bruzelius explains that he follows Dana, and divides the Scandinavian Amphipoda Gammaridea into four families, Dulichidæ, Orchestidæ, Corophidæ, and Gammaridæ, but defines the latter two differently from Dana. He mentions the writings on the Amphipoda with which he was acquainted. He then gives a definition and general description of the group.

In "Familia I. Dulichidæ, Dana," he places *Lætmatophilus*, n. g., thus defined :—

"Corpus elongatum, gracile. Antennæ longæ, superiores flagello appendiculari destitutæ et processui magno frontali affixæ. Mandibulæ palpo triarticulato, maxillæ primi paris lamina interna inchoata et tuberculi-formi, palpo biarticulato instructæ. Palpus pedum maxillarium e quatuor articulis compositus. Pedes primi secundique paris thoracis manu subcheliformi armati, articulo quinto manum formante, ungue ex uno tantum articulo constante. Reliqui pedes thoracis fere æquales, elongati, graciles, unguibus validis armati. Pedes abdominales quarti paris elongati, ramis binis styliformibus instructi, pedes quinti paris e singulis articulis constantes." The type species, *Lætmatophilus tuberculatus*, n. s., pl. i. is described.

In "Familia II. Corophidæ, Dana," Bruzelius arranges the genera *Corophium*, "*Erichtonius*," *Jassa*, *Podocerus*, *Autonoe*, *Amphithoe*. To *Corophium*, Latreille, he assigns, 1. *Corophium longicorne*, Fabricius, which he describes; 2. *Corophium crassicorne*, n. s., pl. i. fig. 2; 3. *Corophium affine*, n. s. He next describes *Erichtonius*, as he spells it, with the type-species *difformis*, Milne-Edwards, to which he makes "*Podocerus Leachii*," Kröyer, a synonym.

He re-establishes *Jassa*, Leach, to receive *Podocerus capillatus*, Rathke; but *Jassa*, Leach, had lapsed as a synonym of *Podocerus*, Leach, and the genus *Janassa*, under which name Boeck revives *Jassa*, Bruzelius, is only separated from *Podocerus* by absurdly trivial distinctions. To *Podocerus*, Bruzelius assigns 1. *anguipes*, Kröyer, of which he remarks that *Gammarus zebra*, Rathke, is in all probability the female; 2. *calcaratus*, Rathke, which Boeck makes a synonym of *falcatus*, Montagu.

The new genus *Autonoe* is thus defined :—

"Corpus subdepressum, epimeris mediocribus aut parvis. Antennæ superiores graciles, flagello proprio multiarticulato et flagello appendiculari instructæ. Antennæ inferiores non subpediformes. Palpus mandibulæ triarticulatus, maxillæ primi paris biarticulatus et pedum maxillarium e quatuor articulis compositus. Pedes primi secundique paris manibus instructi. Pedes abdominales ultimi paris biramei, ramis styliformibus."

To this genus Bruzelius assigns, 1. *Autonoe punctata*, n. s., pl. i. fig. 3, which is a synonym of *Aora gracilis*, Spence Bate; 2. "*Autonoe anomala* (Rathke) ?," pl. i. fig. 4, since called *Microdeutopus anomalus*; 3. *Autonoe grandimana*, n. s. pl. i. fig. 5, which Boeck identifies with *Microdeutopus gryllotalpa*, Costa, with which Bruzelius himself compares

it; 4. "*Autonoe erythrophthalma* (Liljeborg)," for the *Gammarus* (*Gammaropsis*) *erythrophthalmus* of Liljeborg, since called *Gammaropsis erythrophthalmus*; 5. *Autonoe longipes*, Liljeborg, for *Gammarus longipes*, Liljeborg, 1852, which Boeck accepts as the type of the genus *Autonoë*; 6. *Autonoe macronyx*, Liljeborg, pl. i. fig. 6, for *Gammarus macronyx*, Liljeborg, 1853, identified by Boeck with *Protomedeia fasciata*, Krøyer, 1842. To *Amphithoe*, Leach, Bruzelius assigns the species, 1. *podoceroides*, Rathke, with *albomaculata*, Kröyer, for a synonym, and 2. *pygmæa*, Liljeborg, which Boeck identifies with "*Photis Reinhardi*," Kroyer, 1842.

In "Familia III. ORCHESTIDÆ, Dana," Bruzelius places, 1. *Orchestia*, Leach, with the species *littorea*, Leach, including *Euchore*, F. Müller; 2. *Allorchestes*, Dana, with the species "*Allorchestes Nilsoni* (Rathke)," in the synonymy of which he gives "*Amphithoe Prevosti?*, H. Rathke; *Amphithoe Nilssoni*, H. Rathke; *Orchestia Nidrosiensis*, Kröyer"; remarking also that he feels tolerably certain that Rathke's and Kröyer's species are identical with the one he himself describes, but of Milne-Edwards' he is doubtful, as the figure seems to show two rami on the last uropods. Brandt's subgenus *Allorchestina* he considers unnecessary.

In "Familia IV. GAMMARIDÆ, Dana," Bruzelius describes nineteen genera. The species which he calls *Anonyx nanus*, Kröyer?, was called *Anonyx nanoides* by Lilljeborg in 1865, while the *Anonyx minutus*, Kröyer, which he thinks perhaps identical, is called *Orchomene minutus* by Boeck. "*Anonyx Kröyeri*," n. s., pl. ii. fig. 7, was transferred to *Callisoma* by Spence Bate. *Pontoporeia furcigera*, n. s., pl. ii. fig. 8, is said by Sars in 1882 to be the same as the earlier *Pontoporeia femorata*, Kroyer. Bruzelius says that in his species the accessory flagellum of the upper antennæ has three joints as against two in Kroyer's species, and that *Pontoporeia furcigera* is much smaller than *femorata*, while he has always found that in individuals of the same species the number of joints in the flagella increases or diminishes with the size of the animal. Also the fork-like process on the fourth segment of the abdomen is considerably larger than in *Pontoporeia femorata*.

For *Gammarus*, Fabricius, Bruzelius draws up a scheme including thirteen species, which have since been distributed among various genera. "*Gammarus Loveni*," n. s., pl. ii. fig. 9, was transferred to *Mæra* by Spence Bate. *Gammarus lævis*, n. s., pl. ii. fig. 10, was identified by Spence Bate with *Gammarus longimanus* (Leach), Thompson, which Spence Bate places in the genus *Megamœra*. *Gammarus brevicornis*, n. s., pl. iii. fig. 11, is identified in Bate and Westwood with *Liljeborgia pallida*, Speuce Bate.

The new genus *Eriopis*, is thus defined:—

"Corpus elongatum, parum compressum, epimeris parvis. Antennæ superiores pedunculo gracili et flagello appendiculari perpusillo instructæ; inferiores subpediformes. Mandibulæ duobus ramis, tuberculo molari et palpo triarticulato instructæ. Maxilla primi paris palpo biarticulato ornata. Palpus pedum maxillarium e quatuor articulis compositus. Pedes primi secundique paris manu (articulo quinto) subcheliformi armati. Tria paria posteriora pedum thoracis postice gradatim longiora. Rami pedum abdominalium ultimi paris valde inæquales; interior brevis, exterior abdominis longitudinem fere æquans, duobus articulis complanatis instructus." This genus is identified by Boeck with *Niphargus*, Schiodte, 1851, which had hitherto contained only fresh-water species. *Eriopis elongata*, n. s., pl. iii. fig. 12, "habitat in locis profundis maris Bohusiæ." This is called by Boeck *Niphargus elongatus*.

The new genus *Paramphithoe* is thus defined:—

"Corpus compressum, epimeris mediocribus aut magnis. Oculi duo compositi. Antennæ superiores graciles, articulo tertio pedunculi articulis flagelli crassiore, sed flagello appendiculari carentes. Mandibula palpo triarticulato. Palpus maxillæ primi paris biarticulatus, pedum maxillarium e quatuor articulis compositus. Pedes primi secundique paris manu subcheliformi instructi. Pedes septimi paris reliquis pedibus non duplo longiores. Pedes

abdominis ultimi paris biramei, ramis elongatis." To this genus Bruzelius refers nine species; in section *a*, "dorsum magis minusve carinatum, posticum sæpe dentibus armatum," 1. *Paramphithoe panopla*, Kröyer, by Bate, Boeck and Sars now called *Pleustes panoplus;* 2. *Paramphithoe pulchella*, Kröyer, by Bate called *Pherusa pulchella*, by Boeck *Pleustes pulchellus*, by Sars, 1882, *Paramphithoe pulchella;* 3. *Paramphithoe hystrix*, Owen, for which see Note on Lepechin, 1780; 4. *Paramphithoe compressa*, Liljeborg, identified by Boeck with "*Atylus Swammerdamii*," Milne-Edwards; in section *b*, "dorsum rotundatum, segmentis duobus aut pluribus postice dentatis;" 5. *Paramphithoe bicuspis*, Kröyer, by Bate referred to *Pherusa*, by Boeck to *Pleustes*, by Sars, 1882, back to *Paramphithoe;* 6. *Paramphithoe tridentata*, n. s., pl. iii. fig. 13, by Boeck in 1870 named *Halirages tridentatus;* 7. *Paramphithoe elegans*, n. s., pl. iii. fig. 14, by Boeck identified with *Dexamine hispinosa*, Spence Bate, under the name *Halirages hispinosa;* in section *c*, "dorsum rotundatum, carina et dentibus destitutum;" 8. *Paramphithoe læviuscula*, Kröyer, now known as *Calliopius læviusculus;* 9. *Paramphithoe norvegica*, Rathke, now known as *Calliopius norvegicus*, Rathke. Thus it appears that all the species assigned to *Paramphithoe* by the founder of the genus fall to older genera, with the exception of Owen's *hystrix* and the new species *tridentata;* this latter he defines:—"Caput rostro perpusillo instructum. Dorsum rotundatum, læve, segmenti septimi thoracis, primi secundique abdominis margine medio posteriore dentem acutum formante. Antennæ superiores inferioribus longissimis multo breviores. Pedes primi secundique paris manu fere oblongo-ovali, mediocris magnitudinis, instructi. Appendix caudalis indivisa, margine posteriore truncato et dentato." If Boeck's *Acanthozone* is accepted as the generic name for Owen's *hystrix*, *Paramphithoe tridentata*, Bruzelius, remains over to represent the new genus, and would, I imagine, take precedence of Boeck's *Halirages*, unless we may argue that the genus instituted by Bruzelius lapsed through the want of any suitable definition, coupled with the want of any species selected as the type.

After describing *Acanthonotus serra*, Kröyer, *Dexamine tenuicornis*, Rathke, and *Iphimedia obesa*, Rathke, Bruzelius proceeds to define the genus *Ampelisca*, Kröyer, identifying with it Costa's *Araneops*. He assigns to it six species (1) *æquicornis*, n. s., pl. iv. fig. 15; (2) *tenuicornis*, Liljeborg; (3) *lævigata*, Liljeborg; (4) *macrocephala*, Liljeborg; (5) "*Gaimardi*," Kröyer, by Boeck in 1870 named "*Byblis Gaimardi;*" (6) *Ampelisca carinata*, n. s., pl. iv. fig. 16, in which the front part of the back is rounded, and which therefore differs from the *Ampelisca Gaimardi* (*Tetromatus typicus*), Spence Bate, which has "cephalon and pereion laterally compressed and dorsally cuneated."

Bruzelius next describes *Haploops tubicola*, Liljeborg; *Haploops carinata*, Liljeborg; *Bathyporeia pilosa*, Lindström. In the last he has noticed the variations in the antennæ, which subsequently occasioned the institution of new species.

In the genus *Œdiceros*, he describes (1) *Œdiceros obtusus*, n. s., pl. iv. fig. 17, identified by Boeck with *Leucothoë phyllonyx*, M. Sars, under the name *Aceros phyllonyx;* (2) *Œdiceros affinis*, n. s., pl. iv. fig. 18, by Boeck called *Monoculodes affinis*, as also earlier by Spence Bate, who gives it priority over his own *Monoculodes stimpsoni*, whereas J. S. Schneider inclines to identify *Monoculodes affinis*, Boeck, with *Monoculodes stimpsoni*, Bate, and definitely makes *Œdiceros affinis*, Bruzelius, a synonym of *Monoculodes carinatus*, Spence Bate; (3) *Œdiceros saginatus*, Kröyer.

He describes "*Leucothoe clypeata* (Kröyer)?," which Boeck calls "*Metopa Bruzelii*," Goës. Bruzelius notices that his specimens differed somewhat in the antennæ and gnathopods from Krøyer's description, but was content to regard them as the young of Krøyer's species. Sars, in 1882, considers that the form described by Boeck is not the true *Metopa Bruzelii*, Goës, but a distinct species, which he names *Metopa borealis*, distinguished by its more considerable

size, shorter antennæ, and differences in the gnathopods. He gives its length as 3 mm. The length given by Boeck is 2 mm. Bruzelius says the body's length is about 2 mm. *Leucothoe norvegica*, Liljeborg, is next described. Of this he says in a note that it is possibly the male, and *Leucothoe clypeata* the female of one and the same species, an opinion in which Bate and Boeck agree with him.

After describing *Leucothoe articulosa*, Montagu, and "*Laphystius Sturionis*," Kröyer, he defines the new genus *Nicippe*:—

"Corpus crassiusculum, epimeris mediocribus. Antennæ graciles, superiores flagello appendiculari ornatæ. Mandibulæ dissimiles, palpis e ternis articulis compositis instructæ, altera processu accessorio sive ramo interno carens, altera eodem prædita. Palpus maxillæ primi paris biarticulatus. Pedes maxillares laminis minutis et palpis e quaternis articulis compositis. Pedes primi secundique paris manu subcheliformi armati. Tria paria posteriora pedum thoracis postice gradatim longitudine crescentia. Pedes abdominis sexti paris biramei, ramis uniarticulatis." The type species is *Nicippe tumida*, n. s., pl. iv, fig. 19. Lastly he describes *Pardalisca cuspidata*, Kröyer.

1859. Bruzelius, Ragnar M.

Bidrag till kännedomen om Amphipodernas inre byggnad. Öfversigt af Kongl. Vetenskaps-Akademiens Förhandlingar. Årg. 16. 1859. No. 1. pp. 1–18. Tafl. I. (Traduit par M. le Dr. Creplin, dans Wiegmanns Archiv für Naturgeschichte, T. 25, Sars.)

The investigations were made upon "*Gammarus locusta*, Linné, and *Amphithoe podoceroides*, Rathke." Sars, 1867, in regard to the inner structure of the Amphipoda, says, "nous devons les études les plus consciencieuses et les plus exactes au savant suédois, M. Ragnar Bruzelius, qui a écrit sur ce sujet un mémoire accompagné d'une planche lithographiée dans 'Öfversigt af Vetenskaps-Akademiens Förhandlingar, 1859.' Ainsi que le lecteur le verra dans la suite, mes recherches sur cette espèce [*Gammarus neglectus*] s'accordent parfaitement, dans tous les points essentiels, avec les communications de ce naturaliste, fait qui mérite ici une attention particulière, attendu que les renseignments fournis par d'autres savants, entre autres par M. Spence Bate, semblent s'en écarter sous plusieurs rapports."

1859. Danielssen, D. C., born 1815 (G. O. Sars).

Beretning om en zoologisk Reise foretagen i Sommeren 1857. Nyt Magazin for Naturvidenskaberne. 11te Binds 1ste Hefte. Christiania, 1859. (The Volume, "Ellevte Bind," is dated 1861.)

Amphipoda are mentioned on pages 7–9, but without any descriptions. One new species is noted under *Œdicerus*, Kröyer, "O. arcticus n. spec. Af denne nye Art fandt jeg nogle faa Exemplarer ved Vadsöe paa sandig Leerbund fra 40–60 Favne." This is regarded by Boeck as a synonym of *Œdiceros lynceus*, M. Sars, 1859.

1859. Gegenbaur, Carl, born 1826 (Carus), 1827 (Hagen).

Grundzüge der vergleichenden Anatomie. Leipzig, 1859. Arthropoden. pp. 193–286.

For an account of this work remodelled, see Note on Gegenbaur, Grundriss, &c., 1878.

1859. Gervais, Paul, et Beneden, P. J. van.

Zoologie Médicale. Exposé méthodique du règne animal basé sur l'anatomie, l'embryogénie et la paléontologie comprenant la Description des espèees employées en médecine de celles qui sont venimeuses et de celles qui sont parasites de l'homme et des animaux. Tome premier. Paris, 1859.

The Crustacés are the Classe Quatrième of the "Deuxième Embranchement. Animaux articulés." Of the "Sous-classe des Crustacés Édriophthalmes," the authors say, page 486, "les Édriophthalmes sont généralement partagés en trois ordres, nommés *Isopodes*, *Amphipodes* et *Lémodipodes*, auxquels on en ajoute maintenant un quatrième pour les *Pycnogonides*, qui semblent être, à plusieurs égards, un arrêt de developpement des Lémodipodes cyamidés." This view of the *Pycnogonides* is no longer generally held. On page 488, they define the Ordre des Amphipodes, dividing it into two families, "les *Gammaridés* et les *Hypéridés*." To the former belongs the genus Crevette (*Gammarus*), of which they have at least three species in France, "deux d'entre elles vivent dans les cours d'eau et dans les étangs (*Gammarus pulex* et *Roeselii*); ce sont ces Crevettes que l'on trouve souvent dans le cresson. La troisième n'a encore été observée que dans l'eau de puits. Elle est plus petite que les précédentes et étiolée. Nous l'avons appellée *Gammarus lacteus*." This can scarcely be called a scientific description of a new species; but see Notes on Gervais, pp. 156, 160.

In the family of the Hyperidés, les Phronimes (g. *Phronima*) are mentioned with the species *sedentaria*. The Lémodipodes are divided into, "1° les Caprellidés," with the genus *Caprella*, and "2° les Cyamidés," after briefly defining which they say,

"L'ancien genre Cyame (*Cyamus*), qui constitue à lui seul cette famille, comprend plusieurs espèces que l'on trouve sur le corps des grands Cétacés. On les nomme *Poux de Baleines*.

"Le Cyame du Dauphin (*Cyamus delphini*, Guérin) doit former un autre genre que nous nommons *Isocyamus*." Nothing is said of the characters of this new genus. The Pycnogonides, among other habitats, live "sur le corps des poissons."

1859. Hogan, Arthur R.

On the habits and localities of Niphargus fontanus (*n. s.*), N. Kochianus (*n. s.*), and Crangonyx subterraneus (*n. g. & s.*), Spence Bate. The Natural History Review, and Quarterly Journal of Science. Vol. VI. 1859. London, 1859. pp. 166–169.

This paper discusses the habits, food-supply and habitat of the species described in the immediately preceding paper by Spence Bate. As to their food, Mr. Hogan says, "some water drawn from the pump at Ringwood, has been proved, by microscopical examination, to contain numerous animalcules; and this will probably turn out to be the case with all other waters in which Niphargi are found." Some six or seven specimens of *Niphargus aquilex*, from a well near Tunbridge Wells in Kent, lived in my room from January 28, 1886, till March 3, 1886. As they all died at about the same time, it may have been the coldness of the night which killed them. Though they were very active in walking about the bottom of their jar, whenever I happened to look at them during their life-time, I never saw them attempt to swim. Another set of about a dozen were placed in a jar, $5\frac{1}{4}$ inches high by $2\frac{3}{4}$ inches broad, on June 15th, 1886. Two of these were females with eggs. These two died within a couple of days, surrounded by some rapidly developed parasitic growth.

The rest lived on for a considerable time, the last not dying till November 24th, 1886. The water in which they were at first placed came from their native well, and contained a very little sediment. Every four days a small portion was poured away and replenished with water from the town waterworks.

1859. Kinahan, John Robert, born 1828, died February 2, 1863 (Busk).

Notes on dredging in Belfast Bay, with a list of species. (Proceedings of Dublin Natural History Society.) The Natural History Review, and Quarterly Journal of Science. Vol. VI. 1859. London, 1859. pp. 79–85.

In the list of Crustacea Amphipoda, Professor Kinahan avails himself of a list of William Thompson's collection furnished him by Spence Bate. Twenty-eight names of species are given, among them being *Orchestia lævis* and *Orchestia deshayesii* (Savigny). *Gammarus fluviatilis* is mentioned and distinguished from *Gammarus pulex*, but the proper use of the names is evidently inverted. "*Hyperia Galba*" was found "in thousands in Acalephæ, floating through the Bay." The next entry is "*Lestrigonus Fabricii* (?).—This occurred with the last, but in fewer numbers. It is singular that in the supplement to Parry's 'Voyage,' this is figured as having occurred also along with the last. Can there be any intimate connexion, such as sexual, between them? I find some trifling differences between my specimens and *L. Fabricii* (Milne-Edwards), but await my friend Spence Bate's judgment on the point. I strongly suspect that Gosse has mistaken this animal for *Metoicus medusarum*, the distinction between the genera being such as to easily cause a mistake. This is doubtless the species W. Thompson failed to identify, owing to the bad condition of his specimens." The name borrowed from Milne-Edwards should no doubt have been "*Lestrigonus Fabreii*," not "*Lestrigonus Fabricii*."

1859. Lachmann, Johannes.

Über einige *Parasiten des Brunnen-Flohkrebses* (Grammarus puteanus). Sitzungsberichte der niederrheinischen Gesellschaft für Natur- und Heilkunde zu Bonn. Sitzung vom 2. März 1859. Verhandlungen des naturhistorischen Vereines der preussischen Rheinlande und Westphalens. Sechszehnter Jahrgang. Neue Folge: Sechster Jahrgang. Bonn, 1850. (Appendix? pp. 33. 37.)

Grammarus is obviously in error (maintained throughout the paper), for *Gammarus*. The parasites found by Lachmann in the intestine (Darm) of the well-shrimp, are said to belong to the puzzling group of the Gregarines.

1859. Sars, Michael, born 1805, died 1869 (G. O. Sars).

Oversigt over de i den norsk-arctiske Region forekommende Krebsdyr. Forhandlinger i Videnskabs-Selskabet i Christiania Aar 1858. Christiania 1859. pp. 122–163. Amphipoda, pp. 129–150.

The Amphipoda recorded are; 29. Anonyx ampulla (Cancer) Phipps; 30. Anonyx gulosus Kroyer; 31. Anonyx Vahlii Kroyer; 32. Anonyx Holbollii Kroyer; 33. Stegocephalus spec.,

a species found by Krøyer but left indeterminate; 34. Pontoporeia femorata Krøyer; 35. Pardalisca cuspidata Krøyer; 36. "Ampelisca Gaimardii" Krøyer; 37. "Ampelisca Eschrichtii" Krøyer; 38. Ampelisca lævigata Liljeb.; 39. Amphithoë serra Krøyer, with the remark that the fourth side-plate is much too small in the figure in Krøyer's Grønl. Amphip., it being both in Norwegian and Greenland specimens, which Sars had examined, double as long as the third and somewhat deeper. 40. Amphithoë cristata (Acanthonotus) Owen, a species said to be very like *Amphithoe serra*, but still more like a remarkable new species from the coast of Norway, *Amphithoë parasitica*, which is fully described, the Latin description being:—"*A. serræ affinis, dignoscitur carina in medio dorso segmenti thoracici qvinti oriunda et usqve ad segmentum qvartum abdominis porrecta, postice in qvoque segmento in dentem triangularem acutum desinente; oculis magnis, paululum ovalibus, convexis; epimero qvarto et qvinto insolita magnitudine, anterioribus duplo longioribus, qvarto infra et antice, qvinto infra et postice in spinam fortem conico-acuminatam exeunte (in epimero qvarto uncinatam, in qvinto rectam); pedibus thoracicis primi et secundi paris magnitudine mediocri et manu subcheliformi præditis; antennis fere æqualibus aut inferioribus paulo longioribus, dimidiam longitudinem corporis parum superantibus.*" This species was referred to *Acanthosoma* by Boeck in 1860, to *Acanthonotus* by Sp. Bate in 1862, and subsequently identified by Boeck with *Epimeria cornigera*, Fabricius.

A full description is given by Sars of Owen's *Amphithoë cristata*, which "in the short form of the body, the sharp serrate-like back, and strong development of the fourth and fifth side-plates much resembles *Amphithoë serra* and still more *Amphithoë parasitica*, but is distinguished from both inasmuch as the dorsal carina extends over all the peræon-segments and the four first of the pleon (while in both those species it is wanting on the four first peræon-segments) or, as Owen expresses it, 'segmentis 4 anticis in crista continua superne elevatis.' Where, however, the same author adds, 'reliqvis in spinis retrorsum inclinatis productis,' he is so far incorrect as in fact these spines or processes are entirely wanting on the last three abdominal-segments." By Boeck this species is called *Acanthonotozoma cristatum*. The list continues with 41. Amphithoë hystrix (Acanthosoma) Owen. Comparing his specimens with Krøyer's description, Grønl. Amph., p. 260, Sars was inclined to regard the Norwegian form as a distinct species from the Greenland, but by comparison of these with Owen's figure, which he says is more correct than his short description, he was convinced of the identity of the forms from the two localities. To Krøyer's description he offers corrections; —"Hovedet har i Midten af Panderanden et meget lidet, men tydeligt, horizontalt, *tilspidet* Horn, ikke, som Krøyer siger, kun en stump Vinkel. *De øverste Følere ere noget mere end halvt eller næsten Totrediedele saa lange som de nederste* (efter Krøyer naae de ikke disses halve Længde); Skaftets første Led udsender fra Enden af sin øverste Rand en opad og udad rettet *stærk og spids Torn, som næsten er ligesaa lang som selve Leddet* (efter Krøyer er denne Torn lang mindre) eller som andet Led, det tredie Led er kun halvt saa langt. *Svøben*, undersøgt kun hos et enket Exemplar, *bestod af* 79 *Led* (efter Krøyer 'af 20 Led og derover'), af hvilke de 7 (efter Kr. de 4) første Led have i deres underste Rand smaa Haarknipper, men af alle de følgende Led viser, som Krøyer meget rigtigt anfører, kun hvert andet Led Haar og hvert andet er blottet for dem. Svøbens første Led er af Længde som Skaftets tredie Led (efter Kr. er det betydeligt længere). *I de nederste Følleres Svøbe* taltes hos det samme Exemplar 111 Led (efter Kr. bestaaer den 'af i det mindste 50 Led'). *De syv Brystsegmenter ere*, som Krøyer rigtig fremstiller det, *bedækkede med* 5 *eller*, naar man regner Sidepladernes Pig med, 7 *Rækker af Pigge; Bagkroppens* 2 *første Segmenter vise derimod hvert* 9 *Pigge* (af hvilke de 2 nederste ere de mindste), *det tredie* 5, *det fjerde* 3, *det femte og sjette* 2 (idet Piggen paa Midtlinien af disse Segmenter mangler), og det syvende ingen. Heraf sees, at det rette Forhold ikke rigtigt fremstilles af Krøyer, naar han kun angiver 7 Pigge paa Bagkroppens andet Segment og slet ingen paa det femte og sjette.

Owen's Afbildning stemmer derimod med Hensyn til alle disse Pigges Form, Antal og Anordning ganske overeens med Forholdet hos vor norske Form. Mindre noiagtig er hans Beskrivelse, naar det hedder, at 'fjerde og femte Caudal-segment have 3 og de andre kun 2 Pigge.' Dette er urigtigt for det femte Segments Vedkommende, som i Virkeligheden kun har 2 Pigge, saaledes som Owen's Fig. 7 ganske rigtigt udviser. Det første Brystsegment har, som baade Owen og Krøyer angive, 10 Pigge, idet de 3 midterste ere dobbelte; den forreste Pig paa Midtlinien er den længste og ligger horizontalt fremad strakt og ligesom et Horn fremragende over Hovedet.—Hos Exemplarer af $\frac{1}{4}$' Længde befandtes alle Kroppens Pigge allerede fuldkommen udviklede ligesom hos de voxne. Alle Sideplader ende nedentil med en Pig, den fjerde og femte, hvilke ogsaa ere længere end de andre, hver med 2 Pigge. Da hverken Owen eller Krøyer har iagttaget Dyret i levende Tilstand, tilfoies sluttelig, at Kroppens Farve er gulbrun, Brystfødderne og Følerne med rosenrøde Ringe, oftest ere ogsaa Kroppens Pigge i Spidsen rosenrøde. Øinene ere brunsorte, temmelig store (ikke 'smaa og hvide,' som Owen siger), cirkelrunde, halvkugleformig fremragende, deres ydre Flade viser talrige polygonale Facetter." For discussion of the species of *Acanthosoma*, Boeck's *Acanthozone*, see Note on Lepechin, 1778. Buchholz, in his description of "*Acanthozone hystrix* Owen," in 1874, does not allude to Sar's description. The long and strong spine of the upper antennæ which Sars mentions is not shown in Buchholz's figure, though to an unfigured small specimen he attributes "am ersten Basalglied der obern Antenne ein ziemlich langer schlanker, am äussern obern Ende befindlicher Stachel."

The next species is 42. Amphithoë panopla Krøyer?, in regard to which Sars finds that "*Baykroppen hos vor norske Form er meget mere knudret*," and after mentioning some other variations from Krøyer's description, suggests the name *Amphithoë panoploides*, in case the Norwegian form should prove to be specifically distinct, which, however, Boeck does not consider it to be. 43. Amphithoë latipes Sars, nov. spec., is by Boeck called *Amphithopsis latipes*. 44. Amphithoë serraticornis Sars, nov. spec., is identified by Boeck with *Calliopius læviusculus*, Kröyer; 45. Amphithoë fulvocincta Sars, nov. spec., becomes in Boeck's work *Halirages fulvocinctus;* 46. Amphithoë macrocephala Sars, nov. spec., is identified with *Dexamine bispinosa*, Spence Bate, as *Halirages bispinosus;* 47. Amphithoë albomaculata Krøyer (A. podoceroides H. Rathke), is probably *Amphithoë rubricata*, Montagu. Of the following many are discussed elsewhere; 48. Œdiceros saginatus Krøyer; 49. Œdiceros lynceus Sars, nov. spec.; 50. Gammarus locusta (Cancer) L.; 51. Gammarus mutatus Liljeb.; 52. "Gammarus Sabinii" Leach; 53. Gammarus dentatus Krøyer, redescribed; 54. Gammarus fissicornis Sars, nov. spec., by Boeck called *Lilljeborgia fissicornis;* 55. Podocerus capillatus H. Rathke; 56. Ischyrocerus minutus Liljeb.; 57. Leucothoë norvegica Liljeb.; 58. Leucothoë phyllonyx Sars, nov. spec., by Boeck made the type of a new genus, as *Acceros phyllonyx;* 59. Glauconome leucopis Krøyer, in regard to which Sars says that the eyes which Krøyer describes from examples in spirits as "smaa og lidet tydelige," are in the living animal "stærkt iøinefaldende ved deres afstikkende opak melkehvide Farve," and "*paa de 3 første Abdominalsegmenter findes paa hver Side af Ryggen en lav, men temmelig bred, conisk-tilrundet Knude*, som ikke omtales af Krøyer, og efter Figuren i Gaimard's Voyage en Scandinavie, Crust. Tab. 19 Fig. 1, synes ogsaa disse Segmenter at være ganske glatte. De under disse 3 Segmenter siddende saakaldte 'falske Fødder' finder jeg *temmelig store* (ingenlunde 'smaa og korte' som Krøyer Siger)."

60. Caprella lobata (Sqvilla) Müll.; 61. Caprella septentrionalis Krøyer; 62. Leptomera pedata (Gammarus) Abildg.

1859. VALETTE, ST. GEORGE, A. J. H. DE LA.
1860.

Ueber die Entwicklungs-geschichte der Amphipoden. Sitzungsber. Niederrhein. Gesell. f. Natur- u. Heilkunde zu Bonn, XVI. pp. 94–98, 1859.

Studien über die Entwickelung der Amphipoden. Mit 2 Tafeln. Halle. 1860. 14 pages. 2 Plates.

The ovaries are described as lying dorsally upon the gut and liver-tubes on either side of the heart, forming two cylindrical tubes closed at either end, reaching from the second to the sixth peræon-segment with an oviduct opening in the fourth segment. The inner surface is covered by an epithelium layer which is supported by a *Tunica propria* of finely granular appearance, and that in turn is surrounded by an outer skin which is homogeneous. [Bruzelius traces the ovaries from the first to the seventh segment, with the opening of the oviduct at the base of the marsupial plate of the fifth segment. G. O. Sars traces the ovaries from the second to the seventh, with the opening of the oviduct as stated by Bruzelius in the fifth segment]. Neither la Valette nor Bruzelius could discover the lobes of which according to Spence Bate (1855) the ovary of *Gammarus* is composed.

The first origin of the Amphipod-egg is derived by la Valette from an epithelial cell of the ovary. In eggs not far developed he found a sharply defined membrane, a finely granular content, a germinal vesicle and many germinal spots. With further development of the egg-cell violet-coloured drops appear in the hitherto colourless contents, which soon as smaller or larger strongly refracting globules fill the whole egg and conceal the germinal vesicle. The coloured yolk develops itself within the cell-membrane.

La Valette could never succeed in observing zoosperms in immediate proximity to the egg or within it. Of the two skins of the egg one in later stages of the embryo's development sometimes disappears, but the one remaining is not, he says, as Meissner supposes, the chorion or outer, but always the inner, or yolk-skin. The inner skin has a finely *shagreened* appearance; the outer is completely homogeneous.

He thus sums up his view of the earlier stages of the development of the egg. An epithelial cell of the ovary increases in size, its nucleus becomes the germinal vesicle and fills itself with germinal spots, while within the cell-membrane the development of the fine-grained yolk begins. Along with this and perhaps partly at its expense along with the increasing size of the egg appears the violet yolk. The former he calls the formation-yolk, the latter the nourishment-yolk, which at successive stages changes from violet to brown-red and finally to yellow-brown. The formation-yolk divides and perhaps with it the germinal vesicle. In this way arise the yolk-balls including a nucleus, and these after continued division by hardening at the periphery obtain a membrane and become the cells of the embryo-skin. When this has completely sheathed the nourishment-yolk, the whole egg-content draws back on one side from the egg-skin, and by a constriction on that side is divided into two unequal portions still connected on the opposite convex side. On the side where the constriction has taken place the cells of the embryo-skin put out protuberances, marking the position of arteries, mouth-organs and limbs.

A full discussion follows of the micropylic apparatus of the Amphipod-egg, which Meissner first discovered in *Gammarus pulex*. It is confined to the inner or yolk-skin, the outer skin or chorion being completely closed. It lies, not as Meissner supposed, at the pole of the egg, but near the greatest diameter of its breadth. At its central point is a small tap with two small openings. The apparatus occurs at the part of the egg corresponding with the back of the embryo and the third peræon-segment of the developed animal. It is attached to a spherical sack which extends into the heart of the embryo, and which is still observable in

a young animal just escaped from the pouch, though it afterwards disappears. In regard to the use of the apparatus, reference is made to the observations of Leukart [Leuckart] upon the development of the Pupiparæ, showing that the micropyle may have another function than the reception of zoosperms, namely to act as a funnel for the introduction of nourishment. In the case of Amphipods la Valette suggests that it may serve as a respiratory apparatus. He recognises that the outer egg-skin is completely closed, as well as the sack in connection with the micropyle, but he thinks that both might be permeable to the medium surrounding them.

1860. Boeck, Axel, born 1833, died 1873 (G. O. Sars).

Bemærkninger angaaende de ved de norske Kyster forekommende Amphipoder. Forhandlinger ved de Skandinaviske Naturforskeres ottende Møde i Kjøbenhavn 8–14de Juli 1860, pp. 631–677.

Boeck thinks it likely that the division of the Amphipoda into the three principal groups, Hyperidæ, Gammaridæ, Caprellidæ, will always retain its value, while with growing knowledge the minor subdivisions must be subject to variations. In his own classification he has paid regard, he says, not only to the form of feet and tail, but even more particularly to parts less open to view, the mouth-organs, the marsupial lamellæ and the branchiæ. Besides the characters already in use, namely the presence or absence of palps in maxillæ and mandibles and the number of joints to the maxillipeds, he considers the form of the inner plate in the first pair of maxillæ and its garniture of hairs to be of high importance. He attaches weight also to the arrangement of teeth and hairs at the upper end of the œsophagus, although from the difficulty of the investigation he will not for the time delay over these points. He calls attention to a double armature of teeth which the males of many species possess as opposed to the females, and which he notices especially in the mandibles and first and second maxillæ. This, on which he no longer lays stress in his great work, is no doubt only a misapprehension caused by the appearances which precede the moulting of the Crustacean skin.

In his Classification of the Norwegian Amphipoda Boeck places first the tribe Hyperidæ, Dana, because he considers it to be united by a new and very remarkable form, *Trischizostoma*, to the family Orchestidæ, as well as to the genera *Anonyx* and *Opis* among the Gammaridæ.

In the subfamily Hyperinæ he places "*Hyperia Galba*, Mont. (*Latreillii* Edw.)"; *Hyperia spinipes*, n. s.; *Lestrigonus exulans*, Kroyer, and "*Lestrigonus Boeckii*," n. s. (presumably named after Professor Chr. Boeck), both of which he subsequently united with *Hyperia galba* as synonyms of *Hyperia medusarum*, O. F. Müller.

In the second tribe, Prostomatæ, Boeck, he places the single new genus and species, "*Trischizostoma Raschii*," Esmark and Boeck, in which, however, the genus at least is assuredly a synonym of *Guerinia*, Hope and Costa.

In the third tribe, Gammaridæ, for the first family Orchestidæ, he refers to two genera occurring on the Norwegian coasts, but only makes mention of "*Allorchestia Nilsonii*," Rathke's species which has since been named *Hyale nilssonii*. In the second family, Gammaridæ, he gives the following new species, *Anonyx serratus*, which he afterwards named *Orchomene serratus; Anonyx pinguis*, which becomes *Orchomene pinguis* in his later work; *Anonyx obtusifrons*, changed later on into *Menigrates obtusifrons; "Anonyx Bruzelii,"* dropped out of his later works except for a reference in the Index of De Skand. og. Arkt. Amph., to p. 157, from which it may be inferred that he identified his species with *Anonyx gulosus*, Kroyer; *Ichnopus spinicornis; Urothoë norvegica*. He then mentions *Bathyporeia pilosa*, Lindstrom,

from the description and figures of which his own specimens somewhat varied. His next new species is *Pontoporeia armata*, which he afterwards named *Priscilla armata*. The genus *Œdicerus*, Kroyer, he thinks should form two separate divisions, one containing *sayinatus*, Kr., *affinis*, Bruz., *lynceus*, Sars, and *norvegicus*, n. s., the other *novi-zealandiæ* Dana, and *obtusus*, Bruz. For the latter division he institutes a new genus, *Aceros*, using a name pre-occupied among Aves (although there with a different meaning and pronunciation), and taking *Aceros obtusus*, Bruzelius, as the type, which he afterwards named *Aceros phyllonyx*, Sars. His new species, *Œdicerus norvegicus*, he renamed in 1870, *Pontocrates norvegicus*, giving it as a synonym *Kroyeria arenaria*, Spence Bate, 1863. Spence Bate's genus is in fact not the pre-occupied *Kröyeria* but *Kroyera*, which perhaps lapsed as a synonym of *Monoculodes*, and the species *Kröyera arenaria* dates, not from 1863, but 1858, taking precedence, therefore, of Boeck's *norvegicus*. Boeck next gives *Ampelisca spinipes*, n. s., stating that it is very like *Ampelisca æquicornis*, Bruzelius. For a specimen described by Lilljeborg as *Leucothoë articulosa*, Montagu, he proposes a distinct name "*Leucothoë Lilljeborgii*," which in his later works he hesitates to uphold. He recognises that *Leucothoë articulosa* should be called *Leucothoë spinicarpa*, Abildgaard. Making *Probolium*, Costa, a synonym of the earlier *Stenothoë*, Dana, he adds a new species "*Stenothoë Danai*," which he afterwards found to be synonymous with *Stenothoë* (*Montagua*) *marina*, Spence Bate, 1855. After pointing out the resemblances between *Eusirus* and *Leucothoë*, he adds a new species, *Eusirus longipes*. For *Gammarus brevicornis*, Bruzelius, and *Gammarus fissicornis*, M. Sars, he establishes a new genus, *Iduna*, a name pre-occupied among Birds and Annelids, and consequently in Boeck's later works giving place to the synonymous *Liljeborgia*, Sp. Bate, 1862. *Iduna brevicornis* he afterwards identified with *Liljeborgia pallida*, Sp. Bate. To *Dexamine* he adds a new species, "*Dexamine Thea*." For *Amphithoë compressa*, Lilljeborg, he establishes the new genus, *Epidesura*, which was dropped when later on he found the species in question to be *Atylus* (*Amphithoë*) *swammerdamii*, Milne-Edwards, 1830. He makes a new species, "*Gammarus Batei*," of which no notice is taken in his subsequent works, probably because he thought it too obviously a *Gammarus locusta* to be worth further mention. To the genus *Paramphithoë*, Bruzelius, he leaves the species *panopla* and *pulchella*, but establishes a new genus *Amphithopsis* to receive the species, *bicuspis*, *elegans*, *læviuscula*, *tridentata*, and the two new species *Amphithopsis glaber* and *Amphithopsis longicaudata*, the former of which he transferred first to *Paramphithoë*, and afterwards to *Pleustes*, retaining the latter as type of the genus *Amphithopsis*. He discusses the genus *Acanthonotus*, Owen, which he afterwards called *Acanthonotozoma*, and the neighbouring genus, *Iphimedia*, Rathke. To *Acanthosoma*, Owen, he assigns the species, *Acanthosoma hystrix*, Owen, *Amphithoë parasitica*, Sars, and *Epimeria tricristata*, Costa. He afterwards found reason to name the first *Acanthozone cuspidata*, Lepechin, and the other two, *Epimeria corniyera*, Fabricius.

In his third family, Corophidæ, Dana, Boeck places a new genus, *Podoceropsis*, with a new species, "*Podoceropsis Sophia*" (afterwards *Sophiæ*), for its type. After some discussion of species which he considers to belong to *Leptocheirus*, Zaddach, and to *Gammaropsis*, Lilljeborg, respectively, he describes a new species, *Amphithoë grandimana*, and a new genus, *Hela*, with a new species, *Hela monstrosa*, for its type. The name *Hela*, being pre-occupied, has been changed by S. I. Smith to *Neohela*.

The fourth tribe he calls Caprillidea. In it he places *Proto pedata*, afterwards recognized as *Proto ventricosa*; *Ægina longispina*, Krøyer, he here assigns to *Protella*, though he afterwards called it *Ægina phasma*, Montagu, it being properly *Protella phasma*; to *Ægina*, Krøyer, he adds the new species, *Ægina* (*Caprella*) *echinata*, Esmark, which he afterwards claims as his own species, and *Ægina laris*, which, according to Mayer, is the young of *Ægina longicornis*, Krøyer. He next establishes a new genus, *Æginella*, with a new

species, *Æginella spinosa*, as type, also assigning to this genus *Æginа tenella*, Dana, and *Æginа aculeata*, Dana, but in both cases according to Mayer without good reason for so doing. To *Caprella*, Lamarck, he adds three new species, "*Caprella Esmarkii*," *Caprella latiсornis*, *Caprella punctata*, the two first of which Mayer identifies with *Caprella æquilibra*, Say, and the third a little doubtfully with *Caprella septentrionalis*, Kroyer. Boeck himself in his last work inclines to identify *Caprella esmarkii* with *Caprella æquilibra*.

In this work the descriptions of new genera are not very formally drawn out. That of *Trischizostoma* follows the statement that three specimens, all females, were captured by Professor Rasch off Spidnor, by sinking a dead bird, if he remembered rightly, to a depth of about 100 fathoms, and is given thus :—"Det storste Individ maalte 45 m., og den er saaledes en af de storste blandt Amphipoderne. Legemet er stærkt bygget, noget sammentrykt fra Side til anden; Ryggen rund uden Kiol; Hovedet springer fortil frem i et langt og bredt Rostrum, der dækker Roddelene af de ovre Antenner; Øinene ere meget store og dække som hos *Hyperiderne* næsten hele Hovedets Sider samt stode næsten sammen oventil; de ovre Antenner ere de korteste; Skaftet lidet og kort; Svøben dannes af et noget langt, paa den indre Side haarbedækket forste Led, samt 12 til 14 andre kortere; Bisvøben bestaaer ligeledes af et langt forste og to meget mindre folgende Led. De nedre Antenner ere en Trediedeel længere end de øvre; Skaftets tre forste Led ere meget korte; de to folgende længere og indbyrdes af samme Længde, hvorhos det forste af disse er paa den nedre Side saugtakket; Svøben bestaaer af henved 20 Led. De stemme saaledes overeens med Antennerne hos *Hyperidæ* og Slægten Anonyx. Munddelene see ud som en trespaltet fremstrakt Tubus, som er dannet af den overordentligt forlængede Overlæbe og de omdannede Maxillarfodders ydre Plader. Indenfor denne Tubus, efter hvilken Slægtsnavnet er givet, findes de spidse, stærkt forlængede, men spæde Mandibler og Maxiller, der ligne et Slags Braadde. Maxillarfodderne ere forsynede med fiirleddede og Mandiblerne med treleddede Palper. Forste Par Fodder er omdannet til stærke Griberedskaber af en eiendommelig Bygning; femte Led eller Haanden er meget stor, opblæst, og fæstet ved den indre Side til det foregaaende Led. Kloen er ikke som sædvanligt fæstet til den nedre Vinkel, slaaende sig mod den bagre Rand med Spidsen opad, men er fæstet til den bagre øvre Vinkel med Spidsen nedad; den stemmer saaledes i dette noget overeens med Kroyer's Slægt *Opis*. Det andet Par Fødder er dannet som hos Slægten *Anonyx*. Det tredie og fierde Par ere ulige; fierde Pars forste og især tredie Led ere stærkt skioldformet udvidede, medens de hos tredie Par ere smallere. De tre folgende Par ere af den sædvanlige Bygning og tiltage efterhaanden i Længde. Halen er meget bred og stemmer i sin Form meget overeens med *Hyperidernes*, men de tre bagre Par Hale-beens Pedunkler ere kortere end hos disse. Andet Par Epimerer er særdeles stor, trekantet med Basis nedad og den afstumpede Spids opad og skiuler næsten det forste Par.

"Dyret lignet saaledes *Hyperiderne* i Hovedets, Øinenes, Antennernes og Halens Bygning, tildeels ogsaa ved Maxillarfoddernes ydre Plade, der er operculiform; men her findes Palper, som Hyperiderne mangle. I det Hele taget ere Munddelene hos dette Dyr eiendommelige, og synes at være bestemte til Sugning. Det nærmer sig i flere Henseender *Orchestiderne*, men har ogsaa meget tilfælles med Slægterne *Opis* og *Anonyx* blandt Gammariderne ved Antennernes og Foddernes Dannelse."

I have given the above in the original language, as the translation by Dallas is accessible in the Annals and Magazine for May, 1869, and the Latin description will be given further on.

The following remarks on the two species *Œdicerus novi-zealandiæ*, Dana, and *Œdicerus obtusus*, Bruzelius, supply all that is here given by way of definition for Boeck's new genus, *Aceros*: as distinguished from the other species of *Œdicerus*, in these two, he says, the upper antennæ are elongate, the rostrum is wanting, the eyes have their ordinary lateral position. The point of the mandible is not dentate, and the second joint of its palp differs in form

from that in *Œdicerus saginatus*. The inner plate of the first maxilla is large and furnished with several strongly ciliated hairs. From regard to the marsupial plates and their relation to the branchiæ, he would place *Œdicerus* and *Aceros* rather with *Phoxus* and the like than near to *Gammarus*. In the form of the hands of the gnathopods he finds an approach to the subfamily of which *Leucothoë* is the type. Whether *Aceros* with a short penultimate syllable should be considered pre-occupied, because a genus of birds was called *Aceros*, with a long penult, is perhaps an open question.

For the new genus, *Iduna*, or at least for the two species which constitute it, he gives the following characters:—The accessory flagellum is especially long, while the principal flagellum of the upper antennæ is short. The lower antennæ are strong and almost subpediform. The molar tubercle of the mandibles is small; the inner plate of the first maxillæ is, as in *Eusirus*, oval and furnished with a single plumose seta; the biting-plates (Tyggeplader) of the maxillipeds are small and their palps much elongated. The first two pairs of legs are provided with strong clasping hands, their fourth joint sending out from the lower hinder angle a strong process, as in *Leucothoë;* the following pairs of legs are very thin and long, the last pair is very long; the uropods (Halefodderne) are long and the telson deeply cleft. The first side-plate (Epimer) is strong, larger than the next one. Thus they show great agreement with *Eusirus*, and differ much from the typical species of *Gammarus*. The marsupial plates, he says, in this genus are small, the branchiæ long and broad; the palp in the first maxillæ has the first joint short. Alike, he says, in *Eusirus* and *Iduna*, the inner plate of the first maxillæ is larger than [in] the other [members of the group], but in all furnished only with one bristle. In 1876, he says that this plate in *Lilljeborgia fissicornis* has one very long plumose seta and a smaller seta not plumose, and that in *Eusirus cuspidatus* it has two plumose setæ.

His genus *Epidesura*, he says, in many characters approaches *Dexamine*, Leach. The form of the antennæ is as in *Dexamine;* the mandibles, however, have a very thin, weak, triarticulate palp; the palp of the first maxillæ is bi-articulate, and the inner plate is furnished with six ciliated hairs; the biting-plates of the maxillipeds are large, the palps small, thin, with their fourth joint forming a small finger (Klo). The marsupial plates are especially large, furnished on the edges with close-set, long hairs; the branchiæ of the last thoracic legs are of the same peculiar form which is found in *Ichnopus;* the two last segments of the pleon are coalesced and the telson is divided; the body is strongly compressed.

The new genus *Amphithopsis* is instituted for those species (taken from *Paramphithoë*, Bruzelius, and united to two new ones), which have—an elongate, compressed body with moderate epimera and long antennæ; the inner plate of the first maxillæ furnished with four to five long, thick, plumose setæ; the inner plate of the second maxillæ with many simple setæ at the extremity, but several on the inner side very strong and plumose; the maxillipeds large, with palps of moderate length; the two first pairs of feet with hands of nearly the same size, small; the third and fourth pairs of legs with the fifth joint very long, longer than the third joint; the telson simple; the last uropods with the branches long, often unequal; the marsupial plates much larger than the branchiæ, closely margined with hairs.

In the new genus *Podoceropsis*, the body is somewhat depressed, the epimera small, the antennæ long and thin, the upper attached far in advance of the lower at the point of the projecting head. Their peduncle is very long, longer than the flagellum and without accessory flagellum. The mandibles are large, at the extremity divided and dentate, with long triarticulate palp. The palp of the first maxillæ is biarticulate, the inner plate small and thick. The maxillipeds are long, narrow, with the fourth joint of the palp divided into two joints, of which the last forms a pointed nail (Klo.). The two first ("sidste," last, by an obvious mistake for "forste," first) pairs of feet having the fifth joint forming a clasping hand, which in the second pair is much larger than in the first, and not

of the same size in both sexes. The three hinder abdominal-feet are biramous, the rami conical, without spines. Telson small and thin.

Of *Hela*, he says:—"This remarkable new genus is characterized by a long, narrow, depressed body; small, nearly rudimentary epimera; very long legs, of which the first two pairs are furnished with strong clasping hands, the first larger than the second; the last three pairs have the first joint not at all dilated, but narrow and cylindrical like the following joints; the fingers long and conical. The tail is of the usual form, without any of its segments coalesced. Its first three pairs of feet are especially long and thin, the two following pairs biramous, and the last particularly thin, uniramous [grenet for eengrenet], the ramus longer than the peduncle. The mandibles have a divided, dentate point, a prominent molar tubercle, and a thin, triarticulate palp. In the first maxillæ the palp is long, thin, two-jointed, the inner plate small, furnished with a few bristles. The maxillipeds are very strong, with four-jointed palps. The branchial vesicles are found at the bases of the legs from the second to the sixth pair."

As to the new genus *Æginella* he gives his views in two passages; first he says, p. 670, under *Ægina*, Krøyer:—"Krøyer characterizes this genus by the triarticulate palp of the mandibles, and the biarticulate tail with two pairs of appendages, of which the first pair are biarticulate, the second uniarticulate. Dana refers to this genus some species, which differ from the type species *longicornis* by the structure of the tail, and he believes that this is of little systematic importance. But, as I have found two new species which completely agree with Krøyer's characters for *Ægina*, and besides, a species which is like these in that the mandibles have palps, but the tail of which is constructed as in the genus *Caprella*, I think that Dana's species must be transferred from *Ægina* to a new genus, of which this species of mine is the type. To this genus I have given the name *Æginella*." On p. 673, under *Æginella* mihi, he says, "This genus, which forms a link between the preceding genus [*Ægina*] and that which follows [*Caprella*], I have already characterized by its not having palps on the mandibles, and by the tail being, as in the genus *Caprella*, biarticulate, with unjointed appendages" ("ved at den mangler Palpe paa Mandiblerne, og ved at Halen er, som hos Slægten *Caprella*, toleddet med uleddede Appendices"). The discrepancy in the second statement is no doubt accidental, there remains, therefore, the single point in which *Æginella* differs from *Ægina*, namely, in having the abdominal feet unjointed. But Mayer points out, Caprelliden, p. 36, that Boeck is wrong in supposing the abdominal feet in *Caprella* to be unjointed. It is easy, therefore, to suppose that he may have made the same mistake in regard to the specimen which he names *Æginella*, in which case that genus will fall to *Ægina*, unless, since that is a preoccupied name, *Æginella* may be accepted as its substitute.

1860. Leydig, Franz.

Ueber Geruchs- und Gehörorgane der Krebse und Insekten. Archiv fur Anat. und Physiol. Jahrgang 1860. pp. 265–314. Taf. VII.–IX.

See Note on Leydig, 1878.

1860. Lütken, Christian Frederik, born 4 October, 1827 (C. F. L.).

Bemærkninger om *Cyamus*, Forhandlinger paa Skandinav. Naturf. ottende Møde i Kjobenhavn. 1860. pp. 590–592.

The preliminary object of these remarks was to show the error of the common supposition that there was only one species of *Cyamus* in the North Seas. Lütken here distinguishes six

species, leaving the name *Cyamus ceti*, Lin., to that parasitic on *Balæna mysticetus*, and giving the name *Cyamus nodosus*, Ltk., to that living on the Narval, figured in the Zoologia Danica, tab. 119.

1860. Philippi, Rudolph Amandus, born 1808 (Hagen).

Reise durch die Wueste Atacama auf Befehl der chilenischen Regierung im Sommer 1853–54 unternommen und beschrieben von Doctor Rudolph Amandus Philippi. Halle, 1860.

Among the Crustacea Philippi describes one Amphipod, at page 170, thus:—"*Amphithoë andina* Ph.

"Die *obern Fühler* sind so lang wie der vierte Theil des Körpers; die drei Glieder des Stieles sind gleich lang, nehmen aber von der Basis an allmählig an Dicke ab; die einfache, vielgliedridge Geissel ist so lang wie der Stiel. Die *untern Fühler* sind etwas länger als die obern, etwa so lang wie der dritte Theil des Körpers, im übrigen sind sie denselben ähnlich [ähnlich]; das Grundglied des Stieles ist etwas kürzer als das zweite, welches so lang ist wie das dritte; die Geissel ist etwas länger wie der Stiel. Die *Augen* sind klein und eiförmig. Das *erste Fusspaar* ist sehr kurz, kaum so lang wie das erste Brustsegment; seine Glieder sind ziemlich gleich lang; das drittletzte und das vorletzte sind dreieckig, das letzte klauenartig gegen das vorletzte umgeschlagen und so lang, wie der Vorderrand desselben. Das *zweite Fusspaar* ist wenigstens doppelt so lang, gleichfalls zum Greifen eingerichtet; das drittletzte Glied ist viel breiter als lang und nach hinten in einen Lappen vorgezogen; das vorletzte ist gross und dreieckig; das Klauenglied ist ebenso lang wie der Vorderrand des vorletzten Gliedes. Das *dritte* und *vierte Fusspaar* sind so lang wie das zweite und haben cylindrische Glieder. Das fünfte, sechste und siebente Fusspaar sind bedeutend länger als die vorgehenden, zeigen aber sonst die gewöhnliche Bildung, dasselbe gilt von den Anhängseln des Schwanzes.—Die Farbe ist grau.

"*Bemerkung.* Diese Art weicht etwas von Amphitoë ab, indem die Hände dreieckig und nicht eiförmig, und die obern Fühler kürzer als die untern sind, doch scheint mir der Unterschied nicht erheblich genug, um eine generische Trennung zu rechtfertigen.

"Häufig in den Gewässern des hohen Theiles der Wüste: z. B. Cachinal de la Sierra, Agua de Profetas, Rio frio etc."

The account of this species I have quoted in full, as I was neither able to find it mentioned in Mr. Spence Bate's Catalogue, nor to find Philippi's work in the British Museum. It may, I think, be presumed that the species belongs to the genus *Hyalella*, S. I. Smith, and may even be identified with the species *Hyalella inermis*, Smith; the name would be *Hyalella andina*. Philippi calculated the height of Cachinal de la Sierra by the quick-silver barometer at 7516 feet, by the Aneroid, in which he placed less trust, at 6200 feet, above the sea. Agua de Profetas, he says, lies 9180 feet above the sea, therefore, about at the height of Quito. At this place, he says, p. 50, "im Wasser waren Flohkrebse, *Amphithoë andina*, n. sp., *Elmis*, und kleine schwarze Blutegel, aber keine Schnecken, Mückenlarven etc. Auch sah ich sonst kein Insekt irgend einer Art." At page 89 he says, "Der Lagerplatz von Rio frio liegt 10500 Fuss über dem Meere," and at page 91, after describing "die Vegetation des Thales von Rio frio," he says, "im Wasser waren die gewöhnlichen Flohkrebse und *Elmis*."

Hyalella inermis, S. I. Smith, has been taken by Mr. Edward Whymper at heights still greater than those mentioned by Philippi for the habitat of his Amphipod.

1860. Vollenhoven, Samuel Constant Snellen, van.

Naturlijke Historie van Nederland. De dieren van Nederland. Overzigt der gelede dieren. Haarlem, 1860.

Under "de Amphipoden of vlookreeften," he mentions Roesel's species under the name "*Gammarus Roeselii* Gerv.," Pl. ii. fig. 1, distinguishing it from "*Gammarus Pulex* L.," and *Gammarus puteanus* Koch. He mentions also *Talitrus saltator*, Edw., Pl. i. fig. 5; *Orchestia littorea*, Leach, Pl. i. fig. 6, of which he discusses the phosphorescence; "*Corophium longicorne* Desm.," Pl. i. fig. 7; "*Caprella lobata* Latr.," of the female of which he gives a woodcut; and lastly, "*Leptomera pedata* Latr.," Pl. ii. fig. 2, with a reference to Slabber, "Natuurk. Verlust. Plaat X, fig. 1, 2." The figure shows that *Proto ventricosa*, O. F. M., is in question, though the explanation of the plate calls it *Caprella linearis*, probably by an accidental slip.

1861. Bate, C. Spence.

On the Morphology of some Amphipoda of the division Hyperina. The Annals and Magazine of Natural History. 3 Ser. Vol. VIII. 1861. pp. 1–16. Pls. I.–II.

A new species, "*Vibilia Edwardsii*," is described, and the differences between the mother and the young taken from the incubatory pouch are given in detail. A new genus, *Platyscelus*, is thus defined:—"This genus agrees in every respect with Dana's genus *Dithyrus*, except that, after the basa in the third and fourth pairs of pereiopoda, the remaining joints are developed, whereas in *Dithyrus* they are wanting." In the Brit. Mus. Catal., p. 329, Spence Bate adds a note to his description of this genus, "it appears to me to be not improbable that *Platyscelus* may prove to be the female of *Typhis*, from which it differs only in the form of the superior and length of the inferior antennæ." With *Typhis ovoides*, Risso, Claus decisively identifies the species *Platyscelus serratus* here described as new. *Typhis* being preoccupied, Claus renames the genus *Eutyphis*, though on his own showing, *Dithyrus*, Dana, *Thyropus*, Dana, and *Platyscelus*, Spence Bate, have each, in the order named, a prior claim.

The new genus *Brachyscelus* is thus defined:—"Cephalon anteriorly rounded. Eyes occupying the lateral walls, which encroach upon the inferior margin. Pereion not distended, nearly as deep as the cephalon, and not wider. Pleon nearly as broad as the pereion; fourth and fifth segments fused together. Antennæ obsolete or very rudimentary. Oral appendages membranous and rudimentary. Gnathopoda completely subchelate. Pereiopoda having the basa of the three posterior pairs largely developed; fifth pair having the remaining joints not obsolete. Pleopoda biramous. Telson single." The type species is *Brachyscelus crusculum*, of which the female and young are described and figured.

Mr. Spence Bate remarks in regard to the young of the genera he has been discussing, that the adult form which approximates nearest to them is that of the genus *Oxycephalus*, "which bears so close a resemblance to the young of *Platyscelus*, that they might readily be accepted as belonging to one genus." Again, he says, M. Guérin-Méneville's "figure of the young of *Rhabdosoma* appeared to me to be a fair representation of an adult *Oxycephalus*." He thinks that the unimpoverished type in many genera of the Hyperina is to be found nearer to the young than to the adult form. Alluding to the dwelling of many Hyperina in the gill-cavities of Medusæ, he thinks we may assume that eyes, small in the type, have been monstrously increased in these creatures to make up for the depreciation of light that reaches them through the transparent animals they lodge in. To find out their nearest allies among the normal Amphipods, we must compare their young with the more aberrant forms, and

the link Mr. Bate considers is certainly to be found in *Phoxus* and other genera of the subfamily Phoxides.

Claus, in 1879, identifies *Brachyscelus*, Spence Bate, 1861, with *Thamyris*, Spence Bate, 1862, and adopts the later *Thamyris* as the name of the genus, perhaps regarding *Brachyscelus* as pre-occupied, but the only earlier name like it in Scudder's nomenclator is *Brachyscelis*.

1861. Bate, C. Spence, and Westwood, J. O.

A History of the British Sessile-eyed Crustacea. Part I., October 1, 1861. Part II., November 1. 1861. Part III., December 2. 1861. Pages 1–144. London. (The dates at which the Parts were published have been kindly supplied by Mr. John Van Voorst, the publisher.)

As this work, now complete in two volumes dated respectively 1863 and 1868, is now in the hands of every one who studies the Amphipoda in earnest, only such notes upon it will be given as are absolutely necessary to the plan of this Bibliography. In the first three parts no new species are included. A "tabular arrangement of the Amphipoda" is given, at page 10, in the following manner:—

Order.	Group.	Division.	Subdivision.	Tribe.	Family.	Subfamily.	Genus.
Amphipoda.	Normalia.	Gammarina.	Vagantia.	Saltatoria =	Orchestiidæ.		Talitrus, Orchestia, Allorchestes, Nicea.
				Natatoria =	Gammaridæ	Stegocephalides,	Montagua, Danaia.
						Lysianassides,	Lysianassa, Callisoma, Anonyx.
						Ampeliscides,	Ampelisca.
						Phoxides,	Phoxus, Sulcator, Kröyera, Westwoodilla, Grayia, Monoculodes, Amphilochus, Darwinia, Urothoe, Liljeborgia, Phædra, Isæa, Iphimedia, Otus, Acanthonotus.
						Gammarides,	Gammarus, Dexamine, Atylus, Pherusa, Calliope, Eusirus, Leucothoë, Aora, Stimpsonia, Protomedia, Bathyporeia, Niphargus, Crangonyx, Gammarella, Melita, Mœra, Megamœra, Eurystheus, Amathia, etc.
			Domicola.		Corophiidæ	Podocerides,	Podocerus, Cyrtophium, Amphithoë, Sunamphithoë, Cerapus, Siphonoecetus, etc.
						Corophiides,	Corophium, Dryope, Cratippus.
					Cheluridæ,		Chelura.
		Hyperina.			Hyperiidæ,		Hyperia, Lestrigonus.
					Phronimidæ,		Phronima.
	Aberrantia.				Dulichiidæ,		Dulichia.
					Caprellidæ,		Proto?, Protella, Caprella.
					Cyamidæ,		Cyamus.

1861. Beneden, P. J. van.

Recherches sur les Crustacés du littoral de Belgique. Mémoires de l'Académie Royale de Belgique. Tom. xxxiii, Bruxelles, 1861. pp. 1–174. Pl. i.–xxi. (Présenté à l' Académie le 6 mai 1860).

The same, as a separate extract, Bruxelles, 1861.

The part of this work relating especially to the Amphipoda extends from page 95 to page 99 and is devoted to "les Caprellidés." The five genera allotted to this family are called

Leptomera, *Naupredia*, *Cercops*, *Ægina*, and *Caprella*. *Cyamus* is spoken of as non-parasitic, and the *Cyamus* from *Balæna australis* is supposed to be identical with that from *Balæna mysticetus*. The genus *Naupredia*, Latreille, is upheld against those carcinologists who have supposed it to represent a mutilated *Leptomera*. A new species, *Naupredia tristis*, is figured and described, but it is very obvious that a young and mutilated specimen of *Proto ventricosa* is in question. Considering the habit of the Caprellidæ of clinging to supports by their hind peræopods, to have one of the family naturally destitute of these limbs would be most surprising. *Caprella obesa*, also described as new, is thought by Mayer to be possibly the young of *Caprella acutifrons*, Latreille. The specimen was only two millimetres in length.

1861. Grube, Adolph Eduard, born 1812, died June 24, 1880 (Friedländer, Naturæ novitates).

Ein Ausflug nach Triest und dem Quarnero. Beiträge zur Kenntniss der Thierwelt dieses Gebietes. Berlin, 1861.

The following species are described as new, pp. 135–138, 1. *Lysianassa ciliata*, said by Grube to be "*L. humili* Cost. simillima," by J. V. Carus, 1885, who quotes the description, thought to be possibly the same as *Lysianassa audouiniana*, Sp. Bate, but separated both from that species, and from the genus *Lysianassa* by the telson, see Note on Grube, 1866. 2. *Amphithoë brevitarsis*, which Grube in 1864, re-named *Dexamine brevitarsis*; 3. *Amphithoë* (*Hyale*) *istrica*, which he called *Nicea istrica* in 1864, and which may stand as *Hyale istrica*, or as *Hyale prevostii*, M.-Edw. (see Sp. Bate, 1865); 4. *Amphithoë* (*Amphitonotus*) *anisopus*, which in 1864 he called *Dexamine anisopus*, a species obviously founded on a malformed specimen of *Dexamine spiniventris*, Costa; 5. *Amphithoë* (*Amphitonotus*) *leptonyx*, in 1864 re-named *Dexamine leptonyx*, and separated by some not very striking marks of distinction from *Dexamine tenuicornis*, Rathke; 6. *Gammarus recurvus*, which in 1864 he named *Cranyonyx recurvus*; 7. *Colomastix pusilla*, the type of a new genus thus defined:—

"Genus ad Podocerum accedens, corpore depresso-rotundatum epimeribus humilibus. *Antennæ* breves, articulis paucis, flagellis distinctis nullis, nec tamen pediformes. *Pedis paris* 1mi styliformes, 2di subchelæformes, proximorum 5 ambulatorii."

In the list headed, "Ausbeute von Triest, Fiume, Portoré und Cherso," besides the species already mentioned, Grube records, p. 125, the capture of *Lysianassa longicornis*, Lucas; *Lysianassa spinicornis*, Costa; *Amphithoë picta*, Rathke; *Gammarus olivii*, M.-Edw.; *Gammarus locusta*, Linn.; *Leucothoë denticulata*, Costa. At page 24 he mentions *Podocerus pulchellus* in a sponge, and at page 73 "eine Gammarine," taken among stones on the banks of the Wanasee, therefore no doubt the *Cranyonyx recurvus*, already named.

1861. Heller, Camil.

Synopsis der im rothen Meere vorkommenden Crustaceen. (Aus den Verhandlungen der k. k. zoologisch-botanischen Gesellschaft in Wien [Jahrgang 1861] besonders abgedruckt.) 30 pp.

Orchestiæ bottæ, M.-Edw., is the only Amphipod mentioned.

1861. Heller, Camil.

Beiträge zur Crustaceen-Fauna des rothen Meeres. (Aus dem XLIV. Bande des Jahrganges 1861 der Sitzungsberichte der mathem.-naturw. Classe der kais. Akademie der Wissenschaften besonders abgedruckt.) II. Theil. Wien. 1861. (pp. 289–290, 294.)

The only Amphipod described in this work is *Orchestia inæqualis*, which is said to be strikingly distinguished from all other known species by the unequal development of the gnathopods of the second pair. The expression may be intended to refer only to other species of *Orchestia*, otherwise the *Melita palmata* which Spence Bate at one time established as a distinct species under the name *Gammarus inæquimanus*, and *Melita* (*Gammarus*) *fresnelii* of Savigny's Egypt would constitute other well-known species exhibiting the same unequal development. The fact that in Heller's specimen not only was the right gnathopod much larger than the left, but all the five peræopods on the right side showed a somewhat stronger development than those on the left, makes it highly probable that he had before him a monstrosity rather than a true species. Grube's *Dexamine anisopus* seems to be a parallel case.

1861. Heller, Camil.

Vorläufiger Bericht über die während der Weltumseglung der k. k. Fregatte Novara gesammelten Crustaceen. (Aus der Verh. der k. k. zool.-botan. Ges. in Wien [Jahrgang 1861] bes. abgedruckt.) 4 pp.

Reports Amphipoda collected from Madeira, 2 species; St. Paul 3; the Cape 1; Chili 2; a total of eight species.

1861. Herklots, Janus Adrian.

Symbolæ carcinologicæ. Études sur la classe des Crustacés. Leyden, 1861.

The introductory heading well expresses the contents of this pamphlet;—"Catalogue des crustacés qui ont servi de base au système carcinologique de M. W. de Haan, rédigé d'après la collection du Musée des Pays-Bas et les crustacés de la Faune du Japon." "Ordo IV. *Tetradecapoda* de Blainv." has "Sectio 4. *Amphipoda* Latr." and "Sectio 5. *Læmodipoda* Latr." The latter wrongly includes "Gen. *Cerops* Leach," and under *Caprella* gives "Modesta *Templ.*" instead of *nodosa*. No new species are mentioned.

1861. Hogan, A. R.

Notice of British Well Shrimps. Report of the thirtieth meeting of the British Association for the Advancement of Science; held at Oxford in June and July 1860. London, 1861. pp. 116–117.

See Note on Hogan, 1859.

1861. Kinahan, J. R.

Report of the Committee appointed to dredge Dublin Bay. Report of the thirtieth meeting of the British Association for the Advancement of Science; held at Oxford in June and July 1860. London, 1861. pp. 27–31.

At "the Cnook, a bank about seven miles from land in an easterly direction," he met with several species of Crustacea rare elsewhere, among which he mentions "*Tetromatus Bellianus.*" In the "*List of Species obtained in Kingstown and Killiney Bays, and a few from Baldoyle*," the Amphipoda are "Lysianassa longicornis, Anonyx denticulatus, Ampelisca typicus, Urothoe marinus, Urothoe elegans, Iphimedia obesa, Iphimedia Eblanæ, Acanthonotus testudo, Dexamine spinosa, Gammarus locusta, Gammarus fluviatilis, Gammarus palmatus, Gammarus Othonis, Gammarus longimanus, Amphithoe rubricata, Amphithoe littorina, Podocerus falcatus, Podocerus variegatus, Corophium longicorne, Chelura terebrans, Hyperia Galba, Caprella tuberculata," without further information, except a notice that "detailed notes on the species will accompany the final Report."

1861. Lovén, Sven, born 1809 (G. O. Sars).

Om några i Vettern och Venern funna Crustaceer. Öfvers. K. Vet.-Akad. Förhandl. [Föredrag den 10 October 1860]. 1861. pp. 285–314.

An account is given of a remarkable marine fauna found in the large fresh-water lakes of Southern Sweden, called on our English maps Wetter and Wener. The Amphipods mentioned are *Pontoporeia affinis*, Lindstrom, *Gammarus* (*Gammaracanthus*) *loricatus*, Sabine, and *Gammarus cancelloides*, Gerstfeldt. The inference from the whole fauna, of which these are a small portion, is that the lakes just mentioned were at one time part of the sea, but cut off from it, along with their inhabitants, by the rise of the land described in works on geology.

1860–1861. Nardo, Giovanni Domenico.

Cenni illustranti de cinque specie di animali invertebrati (Apus, Branchipus, Gammarus, Gordius e Nais). Venezia, Atti, VI., 1860–61. pp. 341–344.

1861. Pagenstecher, Heinrich Alexander, born March 18, 1825 (G. Pfeffer).

Phronima sedentaria. Archiv für Naturgeschichte. 27 Jahrg. 1 B. p. 15. 1861.

Some account of this important paper is given in Bate and Westwood, ii. pp. 25, 26. Claus, 1862, makes some observations upon it. See also Delage, 1881, p. 90.

1861. Steenstrup, Japetus, og Lütken, Chr.

Mindre Meddelelser fra Kjobenhavns Universitets zoologiske Museum. Forelobig Notits om Danske Havkrebsdyr. Naturh. Forenings Vidensk. Meddelelser. 1861. p. 278.

1862. Bate, C. Spence.

Catalogue of the specimens of Amphipodous Crustacea in the Collection of the British Museum. London. 1862. iv and 399 pages. Plates I.–LVIII. with Plate Ia. Plate XXI. has its lower half devoted to Plate XIVa.

This ambitious work, beyond the promise of its title, aims at bringing together, in systematic arrangement, all the Amphipoda then known to science. The preface explains that the arrangement of the species follows the classification proposed in the British Association Report for 1855, and adopted in the "British Sessile-eyed Crustacea" then in course of publication, but that observation during the progress of the Catalogue had "suggested a more natural arrangement by the absorption of the Orchestidæ as a subfamily into the Gammaridæ, establishing the Phoxides as a distinct family, and placing them between Corophiidæ and Hyperidæ."

The new species described and figured are, in Fam. 1. Orchestidæ:—*Talorchestia? Africana*, with the remark that "it may be the female of the *Orchestia* that Krauss supposed to be *O. Bottæ*;" "*Orchestia Aucklandiæ*," *Hab.* Auckland, as to which Mr. G. M. Thomson writes to me from New Zealand, expressing the opinion that Auckland Islands must be intended. *Orchestia Fuegensis*; "*Orchestia Novæ-Zealandiæ*," which along with *Orchestia tenuis*, Dana, G. M. Thomson unites under the common name *Orchestia sylvicola*, Dana; "*Orchestia Telluris*," of which G. M. Thomson remarks that it "is by no means a terrestrial species. It lives in burrows in the sand just above tide-marks;" *Orchestia megalophthalma* (Orchestia megalophthalmus, *Leach MS., and White's Cat. Crust. B. M.*); *Orchestia trigonocheirus* (Leach MS. B. M.); "*Allorchestes Piedmontensis*"; "*Allorchestes Knickerbockeri*," a species which W. Faxon thinks may be synonymous with *Amphithoë aztecus*, Saussure, 1858, and the later *Hyalella dentata*, S. I. Smith, as Professor Smith had himself suggested, in which case the name would be *Hyalella azteca*: *Allorchestes carinatus*; "*Allorchestes Sayi*": *Allorchestes microphthalmus* (Gammarus microphthalmus, *MS. Brit. Mus.*); "*Allorchestes Inca*," said to be perhaps a sex-form of *Allorchestes hirtipalma*, Dana; (for reference of species of *Allorchestes* to the genera *Hyale* and *Hyalella*, see Note on Rathke, 1837).

In Fam. 2. Gammaridæ. Subfam. 1. Stegocephalides:—*Montagua longimana*, perhaps only a variety of *Stenothoë monoculoides*; "*Montagua Guerinii*," which Spence Bate says bears a strong resemblance to *Stenothoë validus*, Dana.

In Subfam. 2. Lysianassides:—*Anonyx longicornis*, subsequently transferred by its author to the genus *Lepidepereum*; *Anonyx obesus*, subsequently made the type of the genus *Acidostoma*, Lilljeborg; *Anonyx ampulloides*, Stimpson, MS.; *Anonyx punctatus*, Stimpson, MS.; *Anonyx annulatus*, Stimpson, MS.; *Anonyx longipes*, which with Bate's "*Anonyx ampulla*, Kröyer," Boeck renames *Tryphosa longipes*, as respectively female and male of one species; *Phlias rissoanus*.

In Subfam. 3. Ampeliscades:—*Ampelisca ingens* (Pseudophthalmus ingens, *Stimpson, MS.*): "*Ampelisca Japonica*," (Ampelisca Japonica, *Stimpson, MS.*).

In Subfam 4. Phoxides:—

Grayia, new genus, is thus defined:—"Cephalon produced, hood-shaped. Eyes two. Superior antennæ not appendiculate. Gnathopoda subchelate. Perciopoda subequal, and terminating in a sharp-pointed curved dactylos. Posterior pleopoda biramous. Telson squamiform, entire?

"This genus differs from *Œdicerus* of Kröyer in having two eyes, and in the fifth pair of perciopoda not being longer than the preceding."

To this genus two species are assigned, *Grayia imbricata*, n. s., which, in the opinion of A. M. Norman and myself, is the young of *Amathilla sabini*, and *Grayia pugettensis*, Dana, as to

which Spence Bate in a note, page 104, remarks that *Grayia pugettensis* may belong to the genus *Œdicerus*, certainly not to *Iphimedia*, in which Dana had placed it.

Westwoodilla hyalina, n. s., seems to me not distinguishable from *Westwoodilla cecula*, Spence Bate; "*Monoculodes Stimpsoni*," I should have been inclined to unite with *Monoculodes carinatus*, Spence Bate, but that J. S. Schneider keeps them distinct. Spence Bate in his appendix sinks the name *Monoculodes stimpsoni* in favour of *Monoculodes affinis*, Bruzelius, Boeck makes *Monoculodes carinatus*, Spence Bate, = *Monoculodes affinis*, which G. O. Sars thinks very doubtful. Schneider accepts Spence Bate's second thoughts.

Amphilochus, new genus, is thus defined:—"Cephalon produced, anteriorly depressed. Eyes two, posterior to the superior antennæ. Superior antennæ not appendiculated. Gnathopoda subchelate; in both, the carpus is inferiorly produced. Pereiopoda subequal; coxæ of the third pair not so deep as the preceding. Posterior pair of pleopoda double-branched (?). Telson single."

"This genus is distinguished from *Monoculodes* by having two eyes situated laterally, from *Krögera* by having the second pair of gnathopoda not chelate, and from both by the shortness of the posterior pair of pereiopoda."

Boeck accepts the name of this genus, but suggests that it ought to be changed as being preoccupied among the *Coleoptera*, but the name to which he refers is, according to Scudder, differently spelt, *Amphilocus*. The third uropods are in fact double-branched. The type species of the genus is *Amphilochus manudens*, n. s.

"*Urothoë Bairdii*, n. s." is a synonym of the earlier *Urothoë norvegica*, Boeck, 1860; *Urothoë brevicornis*, n. s., as suggested in the Brit. Sess. Crust. i. 198, is not distinct from *Urothoë marinus*, Spence Bate.

Liljeborgia, new genus, is thus defined:—"Cephalon not much produced. Pereion long, slender, and compressed. Inferior antennæ longer than the superior. Coxæ not deeper than their respective segments. Gnathopoda resembling each other in form; second pair larger than the first, subchelate; carpus continuous with the propodos, and produced anteriorly along its inferior margin. Pereiopoda having the dactyla styliform. Posterior pair of pleopoda biramous. Telson single, entire."

"This genus is distinguished from *Urothoë* by the large gnathopoda, small coxæ, and the form of the telson."

The type of this genus is *Gammarus pallidus*, Spence Bate, 1855. Boeck established a genus *Iduna* in 1860, which is synonymous with *Liljeborgia*, but though prior yields to it, the name *Iduna* being preoccupied. It should be noted that the telson, described as entire, is in reality deeply cleft.

"*Phædra Kinahani*, n. s." Boeck thinks may belong to the genus *Liljeborgia*. *Lysianassa spinifera* (Stimpson, Mar. Invert. Grand Manan, p. 49) is not mentioned in the index, but the description is quoted under the genus *Phædra*, with the remark that it "seems to be closely related to this genus, only differing from it, apparently, in the telson consisting of two long spines."

Otus, new genus, the name of which being triply preoccupied, was changed by Lilljeborg into *Odius*, is thus defined:—"Cephalon produced anteriorly. Pereion distended. Pleon compressed. Antennæ simple, subequal. Mandibles having an appendage. Maxillipeds unguiculate. Ischium having a broad plate nearly as long as the four succeeding joints; basos furnished with a long narrow process. First pair of gnathopoda chelate; second subchelate. Pereiopoda short, robust, strong. Posterior pair of pleopoda biramous. Telson single, squamous."

"This genus differs from *Iphimedia* in the form of the maxillipeds, in the distinctly chelate character of the first pair of gnathopoda, and in the larger relative proportions of the second." The type species is *Otus carinatus*, n. s.

In Subfam. 5. GAMMARIDES :—

Brandtia, new genus, is thus defined :—"Cephalon not produced into a rostrum, but elevated into a crest. Antennæ subequal; the superior without a secondary appendage. Gnathopoda subequal, subchelate. Four anterior coxæ as deep as their respective segments of the pereion, not narrow or pointed. Three posterior pairs of pereiopoda short, subequal, having the base dilated at the upper posterior extremity, and narrowing with a concave sweep to the lower. Posterior pair of pleopoda biramous. Telson squamiform, divided." The type species, *Brandtia latissima*, is referred to "Gammarus latissimus, *Brandt, Voyage de Middendorff*," the figures and descriptions having been "taken from specimens sent by Professor Brandt to the Museum at Paris," but, as already explained, that species was in reality instituted by Gerstfeldt, and is retained by Dybowski in the genus *Gammarus*.

"*Dexamine Blosserilliana* n. s."; "*Dexamine Loughrini*, n. s.," in the appendix held to be a variety of *Atylus swammerdamii*; "*Atylus Huxleyanus* n. s.," probably belonging to Boeck's genus *Halirages*; *Atylus villosus*, n. s.; *Atylus gibbosus*, n. s., called *Tritæta gibbosa*, in Boeck's arrangement; *Atylus austrinus*, n. s.; *Pherusa cirrus*, n. s., identified by Boeck with *Amphithoë bicuspis*, Krøyer, which G. O. Sars places in the genus *Paramphithoë*, Bruzelius; "*Pherusa Barretti*, n. s.; *Calliope Ossiani*, n. s.," united by Boeck to *Amphithopsis latipes*, M. Sars, 1858; *Calliope grandocculis*, n. s., a variety of *Calliopius lævisculus*, Kr.; "*Eusirus Helvetiæ*, n. s.," which Boeck assigns to his own *Eusirus longipes*, 1860.

The genus *Seba* is thus defined :—"Slender, smooth. Antennæ long, subequal. Coxæ small, four anterior deeper than the three posterior. Gnathopoda uniform, subequal, chelate." The type species is *Seba innominata*. For both genus and species the authority is hesitatingly given as "*A. Costa, Pochi Crost. di Messina.*" Professor A. Milne-Edwards has kindly searched for the paper referred to, but without success. The genus is not mentioned in de Natale's letter to Costa, 1850 (see Appendix). See also Note on Seba, 1758–1760, p. 18.

Gossea, new genus, is thus defined :—"Slender, compressed. Superior antennæ without a secondary appendage, and having the joints of the peduncle short and subequal. Gnathopoda subchelate; first pair larger than the second. Posterior pair of pleopoda biramous; rami longer than the peduncle and extending considerably beyond the telson. Telson single, squamiform."

"The animals of this genus are very likely, upon a superficial examination, to be confounded with those of *Microdentopus*; but the differences in the superior antennæ, posterior pair of pleopoda, and telson, are considerable and important." The type species is *Gossea microdentopa*, of which the spelling was afterwards corrected to *microdentopa*; both here and in the "British Sessile-eyed Crustacea" it is figured from a defective specimen, only $\frac{3}{20}$ths of an inch long, and bears a suspicious resemblance to a young *Calliopius lævisculus*. M. Chevreux mentions a specimen in his list, 1883, but this he afterwards identified as *Calliopius norvegicus*, Rathke, as he himself informed me.

Stimpsonia, new genus, is thus defined :—"Slender; the inferior pair of antennæ considerably longer than the superior. First pair of gnathopoda larger than the second; carpus broader and longer than the propodos; second pair imperfectly chelate, having the carpus much longer than the propodos. Posterior pereiopoda long. Posterior pleopoda biramous. Telson tubular." The type species is *Stimpsonia chelifera*, n. s. Since the generic name is preoccupied among Vermes, this species may well be placed under Costa's genus *Microdentopus*.

Protomedeia hirsutimanus, n. s., description subsequently completed by A. M. Norman, 1868; "*Protomedeia Whitei* n. s." = *Cheirocratus sundevalli*, ♀, Rathke, according to Norman and Boeck. "*Bathyporeia Robertsoni*, n. s."; both this and Spence Bate's other species, *Bathyporeia pelagica*, are in my opinion synonyms of *Bathyporeia pilosa*, Lindström. G. O. Sars in his Oversigt, 1882, speaks of having convinced himself that *Bathyporeia*

robertsoni is a distinct species, though very near to *Bathyporeia pilosa*. He does not give his reasons. Henri Blanc, 1884, accepts my view. *Melita proxima*, n. s., according to Norman, *Melita obtusata*. ♂ ; *Melita gladiosa*, n. s. The genus *Mæra*, Leach, is given as *Mœra*: the new species assigned to it are *Mœra truncatipes* (Amphitoë truncatipes, *Spinola*, *MS. B. M.* White, Cat. of Crust. in B. M. 1847); "*Mœra Blanchardi*": *Mœra pocillimanus*; *Mœra pectenicrus*. *Eurystheus bispinimanus*, n. s., an obscure species founded on a single imperfect specimen, is perhaps the female of the preceding species in the same genus, named *erythrophthalmus*. *Amathia dentata* is given as the name of a species from Pondicherry, with the synonym "Gammarus dentatus, *Catalogue of the Crustacea in the Museum of the Jardin des Plantes*." It is neither described nor figured, but said to resemble closely *Amathia sabinii* and *Amathia carinata*: the genus *Eurystheus* falls to the earlier *Gammaropsis*, Liljeborg, 1854.

Pallasea, new genus, is thus defined:—"Superior antennæ longer than the inferior, and furnished with a secondary appendage. Inferior antennæ subpediform, having the peduncle considerably longer than the flagellum: the flagellum short and stout. Mandibles having an appendage. Maxillipeds subpediform, having a small squamiform plate to the ischium only. Gnathopoda uniform, moderately large. Pereiopoda subequal. Posterior pleopoda biramous. Telson single, cleft."

"This genus is very nearly allied to *Amathia*, from which it differs more in the general aspect of the animal than in structural details. The form of the inferior antennæ, together with the altered condition of the maxillipeds, are appreciable characters that distinguish the genera from each other." The type species is *Oniscus cancellus*, Pallas, from which *Pallasea cancelloides*, Gerstfeldt, differs apparently in a very slight degree, according to the Appendix, p. 380. The name *Pallasea*, according to Boeck, is preoccupied for a Dipterous insect, but the insect's name in Scudder is given as *Pallasia*.

Gammaracanthus, new genus, is thus defined:—"Dorsal margin carinated, and having the posterior central margin with one or more segments produced posteriorly. Pleon without fasciculi of spines. Superior antennæ having a secondary appendage. Inferior antennæ longer than the superior. Mandibles with an appendage. Maxillipeds subpediform, unguiculate, having the squamiform internal processes but slightly developed. Gnathopoda subchelate and subequal, having the carpus inferiorly produced. Coxæ of the third pair of pereiopoda not so deep as the fourth. Posterior pair of pleopoda biramous; rami foliaceous. Telson double."

"This genus is selected from that of *Gammarus* of authors generally, comprising the Division AA. of M.-Edwards, and + 1*a* of Liljeborg." Boeck remarks that it is not the inner, but the outer, plates of the maxillipeds that are little developed. The type species is *Gammarus loricatus*, Sabine.

Upon *Gammarus semicarinatus*, n. s., the remarks are added that "this may be the *Gammarus mucronatus* of Say," and that "the species is of considerable interest, as associating the genera *Amathia* and *Gammaracanthus* with *Gammarus*." Sp. Bate knew of no other distinctly carinated species carrying the dorso-caudal fasciculi of spines. Previously, on p. 203, he gives Say's species as *Gammaracanthus mucronatus*. *Gammarus subcarinatus* (Gammarus subcarinatus, *Stimpson*, *MS.*) comes from Behring's Straits. *Gammarus multifasciatus* (Gammarus multifasciatus, *Stimpson*, *MS.*) is from Grand Manan. *Gammarus Redmanni* (Gammarus Redmanni, *Leach*, *MS. B. M.*, Gammarus ornatus, *White*, *Cat. Crust. B. M.* 1847 (not *Edwards*)) is from Jamaica. *Gammarus tenuimanus*, n. s., is probably an accidental variety of *Gammarus locusta*, as indeed is hinted in the Brit. Sess. Crust. vol. i. p. 384.

Megamœra, new genus (answering to *Gammarus*, Div. A.*aa*. M.-Edwards and *Gammarus*, Div. + 2, Liljeborg), is thus defined:—"Dorsal segments of the pleon without fasciculi of spines.

Eyes round. Superior antennæ long; inferior about half the length of the superior. Gnathopoda subchelate, the second pair being the larger. Posterior pair of pleopoda biramous. Telson double."

"This genus is distinguished from *Mœra* by the relative size of the second pair of gnathopoda, by the greater size of the coxæ, and by the more compact form of the animal generally; and from *Gammarus* by the absence of the fasciculi of spines upon the dorsal surface of the caudal segments and the shortness of the inferior antennæ. It is included by most authors in the genus *Gammarus*, but distinguished as a group by itself." In the Brit. Sess. Crust. p. 400, it is said to be distinguished from *Mœra*, as well by the coxæ and second gnathopods, as "generally by the greater length of the posterior pair of caudal appendages." Heller and Boeck make it a synonym of *Mœra*. The new species assigned to it are *Megamœra serrata*, n. s., which is no doubt a synonym of *Mœra rubromaculata*, Stimpson; *Megamœra semiserrata*, n. s.; "*Megamœra Alderi*, n. s.," which in the Brit. Sess. Crust., vol. i. p. 407, occurs as *Megamœra? alderi*, with the rather singular observation that "the character of this animal appears to justify its admission as a species in the present genus, but we desire to express our conviction that it will ultimately be ascertained to be the female of a species of *Melita*, probably *Melita proxima*." This conviction is confirmed by A. M. Norman, who considers *Megamœra alderi* the ♀ and *Melita proxima* the ♂ of *Melita obtusata*.

Fam. 3. Corophiidæ. Subfamily 1. Podocerides, receives "*Amphithoë Falklandi*, n. s."; "*Amphithoe Australiensis*, n. s."; "*Amphithoë Desmarestii*, n. s.," identified by Catta, 1876, with *Amphithoe penicillata*, Costa, but which is more probably a synonym of *Amphithoë vaillantii*, Lucas, 1849; *Podocerus ocius*, n. s.; "*Cerapus Hunteri*, n. s.," entered by S. I. Smith as a synonym of *Erichthonius difformis*, M.-Edwards.

Nænia, new genus, is thus defined:—Antennæ subequal; superior without a secondary appendage; inferior arising posteriorly to the superior. Gnathopoda subchelate; second pair very large. Pereiopoda strong, subequal. Posterior pair of pleopoda biramous, rami styliform. Telson tubular, tipped with one or two rudimentary denticles.

"This genus differs from *Eurystheus* chiefly in the absence of the secondary appendage to the superior antennæ and in the larger size of the second pair of gnathopoda." The type species is *Nænia tuberculosa*, n. s., which Boeck considers a synonym of his *Podoceropsis sophiæ; Nænia rimapalma*, n. s., is changed to *Nænia rimapalmata*, in the Brit. Sess. Crust., p. 474. *Nænia excavata*, n. s., is doubtfully distinct from the preceding; *Nænia undata*, n. s., may perhaps belong to some other genus.

Cratippus, new genus, is thus defined:—"Body long. Antennæ short; flagella rudimentary; superior pair without any secondary appendage. Coxæ not so deep as the pereion. Gnathopoda subchelate; second pair having the propodos much larger than that of the first. Pereiopoda subequal. Three posterior pairs of pleopoda having short rami. Telson squamiform (?)." "The rudimentary character of the flagella of the antennæ, the absence of the secondary appendage, and the shortness of the coxæ are characters that separate this genus from *Podocerus;* the size and form of the second pair of gnathopoda distinguish it from *Corophium;* and the shortness of the antennæ and relative proportions of the gnathopoda separate it from *Dryope* and *Unciola*." The type species is *Cratippus tenuipes*, n. s., but both genus and species have been anticipated by *Colomastix pusilla*, Grube, 1861. Grube (and subsequently Norman in his also synonymous *Exunguia stilipes*), shows that the first gnathopods, instead of being subchelate or "scarcely subchelate," are *exungues*, without a finger.

Dryope, new genus (answering to *Unciola*, Gosse, Marine Zool. i. p. 141, not Say) is thus defined:—"Animal long and slender. Superior antennæ without a secondary appendage; inferior antennæ not longer than the superior. Coxæ not so deep as the pereion. First pair of gnathopoda larger than the second, subchelate; second pair small, imperfectly chelate.

Posterior pair of pereiopoda longer than the others. Posterior pair of pleopoda short, almost rudimentary, double-branched. Telson single, squamiform."

"This genus differs from *Uneiola* of Say in the absence of a secondary appendage to the superior antennæ, in the form of the second pair of gnathopoda, in the shortness of the posterior pair of pleopoda, and in the character of the telson." The type species is *Uneiola irrorata*, Gosse (not Say). *Dryope crenatipalma*, n. s., re-named *crenatipalmata* in the Brit. Sess. Crust., seems to me to be only a variety of *Dryope irrorata*. The secondary appendage, though very small, is not wholly wanting to the upper antennæ.

Corophium spinicorne, n. s., is considered by Boeck a synonym of *Corophium crassicorne*, Bruzelius, 1859. The name too was preoccupied by Stimpson in 1856.

Division Hyperina. Fam. 1. Hyperidæ. "*Lestrigonus Kinahani*, n. s.," is held by Boeck to be a synonym of *Hyperia medusarum*, Müller, which Meinert rejects, considering Müller's description too indefinite, and therefore adopting the name *Hyperia galba*, Montagu. Streets would keep *Lestrigonus* distinct from *Hyperia*. "*Vibilia Edwardsii*," though here given as new, had been already published in the Annals and Magazine of Nat. Hist., 1861. *Vibilia affinis* (Vibilia affinis, *MS. Cat. Musée Jardin des Plantes*) is from Java. "*Cyllopus Lucasii*, n. s.," is from "the Powel [Powell] Islands," now known as the S. Orkneys; "*Cyllopus Danæ*, n. s.," from "near the Powel Islands," is probably a younger form of *Cyllopus lucasii*. "*Themisto Guérinii*, n. s.," "*Hab.* (In the Atlantic?) Latitude of La Plata (*MS. label*)," is said to resemble closely the much larger *Themisto antarctica*, Dana.

Fam. 2. Phronimidæ. Subfam. 1. Phronimides. "*Phronima Borneensis*, n. s." (Phronima Atlantica, *White, Cat. Crust. B. M.* 1850) is no doubt, as Spence Bate himself suggests, to be identified with *Phronima sedentaria*, Forskål. Subfam. 2. Phrosinides. *Phrosina longispina*, n. s., is doubtfully distinct from *Phrosina semilunata*, Risso, with which Sp. Bate is inclined to unite *Phrosina nicetensis*, M.-Edwards. *Anchylomera antipodes*, n. s., was taken "near the Antipodes."

Fam. 3. Platyscelidæ. *Platyscelus*, here given as a new genus, though already described in the Ann. and Mag. of Nat. Hist., July 1861, is a synonym of *Dithyrus*, Dana. Of the species "*Platyscelus Rissoinæ*, n. s.," and *Platyscelus serratus*, n. s., the latter is united by Claus to *Typhis ovoides*, Risso, and he inclines to treat the former in the same manner.

Brachyscelus is here given as a new genus, but the description of it and of the type species, *Brachyscelus crusculum*, appeared in the Ann. and Mag. of Nat. Hist. for July 1861.

Thamyris, new genus, is thus defined:—"Superior antennæ short, three-jointed. Inferior antennæ obsolete. Posterior pair of pereiopoda represented by a basos in the form of a membranous scale only."

"In all other respects this genus so nearly corresponds with *Brachyscelus*, that future research will probably demonstrate their closer connection." The type species is *Thamyris antipodes*, n. s. Claus decides that *Thamyris* is the male of *Brachyscelus*. His own genus *Schuchagenia* he recognises as an additional synonym, and names the genus *Thamyris*, but *Brachyscelus* has the priority. *Brachyscelus* in turn must yield to *Dairdia*, Dana, if the suggestion of Bovallius be accepted, that *Dairilia* is identical with *Thamyris*.

Amphipronoë, new genus, is thus defined:—"Cephalon round, anteriorly oblique. Pereion not broader than the cephalon. Pleon having the fourth and fifth segments fused into one. Superior antennæ having the peduncle three-jointed; third joint large, inferiorly convex and anteriorly produced, having the superior margin subapically excavated to receive the short flagellum. Inferior antennæ five-jointed. First pair of gnathopoda complexly subchelate; second pair not subchelate. Third and fourth pairs of pereiopoda largely dilated, having the remaining joints as long as the basa; fifth pair rudimentary. Posterior

pair of pleopoda biramous, foliaceous. Telson nearly as broad at the base as the preceding segment of the pleon."

"This genus is very closely allied to Pronoë, but differs in the form of the superior antennæ and of the gnathopoda, and in the fusion of the fourth and fifth segments of the pleon into one." The type species is *Amphipronoë cuspidata*, n. s. Claus gives up this genus as not defined with sufficient accuracy. On the supposition that the first and second gnathopods have been interchanged in the description, he thinks it might be the same as his own genus *Parapronoë*. In any case the distinction drawn between *Amphipronoë* and *Pronoë* grounded on the fusion of the fourth and fifth segments into one, seems untenable, the rule in the Hyperina being that the fifth and sixth segments, not the fourth and fifth, of the pleon, coalesce.

In Fam. 5. Oxycephalidæ, "Subfam. 1. Synopiades" is certainly out of place. In Subfam. 2. Oxycephalides, *Oxycephalus tuberculatus*, n. s., is, according to Claus, a synonym of *Oxycephalus piscator*, M.-Edwards; "*Rhabdosoma White*i, n. s.," according to Claus, is the male of *Rhabdosoma armatum*, M.-Edwards.

Group Aberrantia. Fam. 2. Caprellidæ. *Caprella calva*, n. s., is recognised in the Brit. Sess. Crust. as = *Caprella acanthifera*, Leach; *Caprella ultima*, n. s., according to Mayer = *?? Caprella æquilibra*, Say.

1862. Bate, C. Spence.

Note on the supposed "Discovery of an extremely minute Vertebrate Lower Jaw in mud dredged at St. Helena, by Dr. Wallich, F.L.S." The Annals and Magazine of Natural History. 3 Ser. Vol. X. December 1862. pp. 440–441.

The supposed jaw in Mr. Spence Bate's opinion may be the dactylos or last joint of a leg of a small *Hyperine Crustacean*. He figures a leg of *Phrosina longispina* for comparison, and supposes that Dr. Wallich may have been misled by seeing a second row of marginal armature within the external one, such as appears in Crustacea near the period of moulting.

1862. Claus, C.

Bemerkungen über Phronima sedentaria Forsk. und elongata n. sp. Abdruck aus der Zeitschr. f. wissensch. Zoologie. Bd. XII. Hft. 2. 1862. pp. 189–196. Mit Tafel XIX.

In the heart of *Phronima sedentaria*, "the three pairs of lateral openings, which serve as venous Ostia for the reception of the blood flowing back from the body to the heart, are found in the second, third, and fourth thoracal-segments." From the point of the heart an arterial vessel, constituting the abdominal Aorta, stretches from the middle of the sixth peræon-segment almost to the middle of the third pleon-segment. The Aorta cephalica is also mentioned. Claus also here speaks of two fine strings in the third and fourth peræon-segments running "von der ventralen Fläche des Herzens aus schräg nach oben und vorn zum Magen," which he supposes may serve for fastening, although at first inclined to regard them as arteries. In his later work on the Phronimidæ 1879, he finds that these are really lateral arteries, constant in the genera of the Phronimidæ, and in *Paraphronima* and several other Hyperina supplemented by a third pair. He says that Pagenstecher has attributed

to the thorax a ganglion-pair too many, and in the last peræon-segment figured a ganglion in a place, where none such exists. The habitation which the female *Phronima sedentaria* occupies is discussed.

Phronima elongata, n. s., Taf. xix. Figs. 2, 3, 7, is described. This subsequently became the type for a new genus as *Phronimella elongata*.

Phronima sedentaria, Taf. xix. Figs. 1, 4, 5, 6, is described, and the suggestion made that *Phronima atlantica* of Guérin and M.-Edwards (*Phronima custos*, Risso) is the not completely adult form of *Phronima sedentaria*. With reference to the sort of metamorphosis which Pagenstecher had shown that this species undergoes as it advances in age, Claus states that he has noticed similar facts in regard to *Phronima elongata*, in which, he says, the most interesting peculiarity is "die Anwesenheit zweier einfacher stummelförmiger Fühlhörner unterhalb der grösseren 2gliedrigen Antennen (Fig. 7.). Die junge Ph. elongata hat also wie die ächten Hyperinen zwei Antennenpaare und es ist das obere Paar, welches in der späteren Zuständen persistirt."

1862. Claus, C.

Ueber Phronima elongata Cls. Hierzu Tafel VI. (Fig. 6–11). Würzburger naturwissenschaftliche Zeitschrift. III. Band. 1862.

Claus gives a further description, believing that he has found the male form. This in 1872 he decided to be "das noch junge Männchen vor Eintritt der Geschlechtreife und vor der Entfaltung sämmtlicher Antennenglieder." He corrects an oversight in the previous account, where the fourth pair of feet, instead of the third, was stated to be the longest. Of the second uropods, he says, "das mittlere Paar der 3 Springfüsse sehen wir an dem ausgebildeten Weibchen vollständig hinwegfallen, bei dem Männchen dagegen entwickelt sich dasselbe jederseits zu einem engen und kurzen Schlauche, der an seiner Spitze einfach bleibt und kaum über das letzte Leibes-segment hinaus ragt. Die hakenförmige Anlage dieser Extremität, wie wir sie in den 4–5 Mm. langen Jugend-stadien antreffen, würde demnach in beiden Geschlechtern eine verschiedene Veränderung im Laufe des weiteren Wachsthums erleiden." He figures and describes the mouth-organs.

1862. Costa, Achille.

Osservazione sul genere Lysianassa *e descrizione di una novella specie.* Annuario del Museo zoologico della R. Università di Napoli per Achille Costa. Anno 1. Napoli, 1862. pp. 79–82.

In a species discovered by Costa the lower antennæ are furnished with a slender flagellum as long as the body. This seemed to him a difference of almost generic value, but the rest of the organization was so perfectly identical with that of *Lysianassa* that he was content to let it rank as a specific distinction. It is now known to be only a sexual character of the adult male. He names the species *Lysianassa filicornis*. The Latin description of it is :— "*L. antennis superioribus corporis quarto brevioribus, pedunculi articulo primo valde incrassato, infra spina acuta terminato ; inferioribus seta gracillima corporis longitudinem æquante ; pedibus primi paris manu elongato-conica, unguiculo validiusculo pradita, secundi paris longioribus, gracilioribus, manu ovato-rotundato, setis terminata ; pedibus spuriis abdominalibus æque terminatis.* Longit. corp. millim. 10." Tav. II, fig. 18–23.

1862. Costa, Achille.

Annuario del Museo Zoologico della R. Universita di Napoli per Achille Costa. Anno I. Napoli, 1862.

Articolo 10°. *Osservazioni sulla* Diphya quadrivalvis *e su' Crostacei che si sviluppano entro i bottoni delle appendici urticanti.* pp. 90–94.

While watching some specimens of *Diphya (Galeolaria) quadricalris*, Costa noticed some movements in the urticating apparatus which surprised him. He found them due to a little Crustacean encased in the "bottoni," which stand at the extremity of the secondary filaments. "Entro que' bottoni, come entro di un sacco cistico, era un piccolo Crostaceo, nello stato quasi embrionale, co' piedi toracici ripiegati contro il petto ed immobili, e con i falsi piedi addominali in continuo movimento. L'abito generale dell' animale ci porterebbe a vedervi qualche affinità con le *Phrosine*; però la struttura de' piedi non presenta nulla de' caratteri proprii de' Crostacei di tal genere; siccome non ci è permesso vedervi con esattezza alcuno de' generi già noti nello stato adulto. Laonde, salvo sempre a ben fissarne le note caratteristiche, noi le chiameremo *Diphyicola rubens*." He proceeds to ask, whence come the eggs of the Crustaceans, in what way do they penetrate into the appendages of the *Diphya*, when do they leave this receptacle, etc.? The observation is most interesting, but it seems rash to have constituted a new genus, with practically no characters. Figures 5, 6, are given on pl. iii., of the animal in a very embryonic condition in its involucre, and "figura 7, Il Crostaceo osservato in altro bottone più sviluppato, ed avente già tutte le parti ben determinate. Esso rimaneva avvolto da una semplice membrana, la quale come per un funicello era attaccata al filamento accessorio indicata."

1862. Bate and Westwood.

A History of the British Sessile-eyed Crustacea. Part IV., January 1, 1862. Part V., February 1, 1862. Part. VI., April 1, 1862. Part VII., May 1, 1862. Part VIII., July 1, 1862. Part IX., November 1, 1862. Part X., December 1, 1862. pp. 145–480, each Part in this work containing 48 pages. London.

At page 161 *Œdiceros parrimanus*, n. s., is figured and described, on which the authors remark that "Kroyer in his generic description states that both pairs of hands are very large," whereas in their species "neither of the hands can be described as being large, and the second is decidedly smaller than the first." In vol. ii. p. 528, 1868, the authors mention specimens which they think must be the male form. "They differ from that described in having the upper antennæ but little longer than the peduncle of the lower, the lower antennæ as long as the entire animal, and the gnathopoda with hands somewhat larger, but scarcely equal to the 'very large' hands as described by Kroyer in his description of the genus."

At page 177 *Kroyera altamarina*, n. s., is figured and described. By J. Sparre Schneider, 1885, this is made a synonym of *Pontocrates norvegicus*, Boeck. See Note on Schneider, 1885.

At page 206 *Liljeborgia shetlandica*, n. s., is figured and described. This appears to be a synonym of *Cheirocratus sundevalli*, Rathke, 1843.

At page 226 is given the new genus *Pereionotus*, thus defined:—

"Cephalon short. Pereion distended. Pleon compressed. Antennæ very short. Superior longer and more robust. Gnathopoda subchelate, subequal. Pereiopoda short, robust.

Antepenultimate pair of pleopoda having the peduncle very short, rami long, subfoliaceous. Penultimate pair having the peduncle long, rami styliform. Ultimate pair short, unibranched. Telson single." The authors remark further, "this genus bears a near relationship to that of *Phlias* of Guérin. The only distinction of importance which we are enabled to discover exists in the form of the posterior pair of caudal appendages; these are biramous in the description and figure of *Phlias*, as given by the author in the 'Magasin de Zoologie' for 1836." Of *Phlias rissoanus* the authors had a specimen at command, but they say "the specimen being small, we were not able to make out the form of the last pair of caudal appendages without dissection, and we felt unwilling to destroy our only specimen," by this means saving their specimen and destroying its use. Such economy was particularly undesirable in the present instance. The genus *Pereionotus* was instituted to receive the *Oniscus testudo* of Montagu, which was preserved in the British Museum, and had been supposed by Adam White to belong to the genus *Acanthonotus*, Owen. See Note on Montagu, 1808. It is only by a minute comparison of the figures as well as the descriptions given by the various authors, respectively, of *Phlias serratus* by Guérin, 1836, of *Pereionotus testudo* by Bate and Westwood, and of *Icriidium fuscum* by Grube (1863) 1864, that the close connection between these three forms can be appreciated. When also the minuteness of the specimens is borne in mind, the possibility of error in one or more of the descriptions will be taken into account.

At page 242 *Deramine vedlomensis*, n. s., is figured and described. This is named *Atylus vedlomensis*, by Boeck.

Calliope jingalli, n. s., figured and described at page 263, may possibly, the authors say, "be only an exaggerated variety of *C. Ossiani*." By Boeck both of these species are considered to be synonyms of *Amphithopsis latipes*, M. Sars, 1858.

At page 333 *Gammarella normanni*, n. s., is figured and described, with the remark that "this animal bears so close a resemblance to the preceding that we are inclined to think that it may only be the female of that species," *i.e.*, *Gammarella brevicaudata*, M.-Edw. The specimen described has the flagella of the upper antennæ longer than those observed in *Gammarella brevicaudata*, though in other respects agreeing with the female of that species. It is possibly a young male.

The genus *Amathia*, Rathke, is here (p. 359) renamed *Amathilla*, *Amathia* being pre-occupied among Polyps, Decapod Crustacea, and Moths.

At page 411 is introduced the new genus *Eisladus*, thus defined :—

"Slightly compressed. Eyes on a prominently-advanced lobe between the superior and inferior antennæ. Superior antennæ without a secondary appendage. Gnathopoda subchelate. Coxæ of the third pair of pereiopoda having the anterior lobe as deep as the coxæ of the second. Posterior pair of pleopoda biramous, rami unequal. Telson squamiform, single." This genus has since been recognised as a synonym of *Photis*, Krøyer, 1842. The type species, *Eisladus longicaudatus*, figured and described as new at page 412, is by Boeck considered a synonym of "*Photis Reinhardi*," Krøyer, with which it agrees in the excavate and dentate palm of the second gnathopods.

1862. Gerstaecker, Carl Eduard Adolph, born 1828 (Hagen).

Bericht über die wissentchaftlichen Leistungen im Gebiete der Entomologie während des Jahres 1861. Archiv für Naturgeschichte. Berlin, 1862. Crustaceen. pp. 528–571.

1862. Gerstaecker, C. E. A.

Handbuch der Zoologie (mit V. Carus und Peters). Leipzig, 1862.

The Articulata by Gerstaecker (Hagen).

1862. Hoeven, J. van der.

Determinatio Iconum Slabberi. Verslagen en mededeelingen der Kon. Akademie van Wetenschappen XIV, 1862. pag. 270 sqq.

I take the notice of this work from R. T. Maitland, 1876. See Note on Maitland, under that date, for the information affecting the Amphipoda.

1862. Lovén, Sv.

Till frågan om Ishafsfaunans fordna utsträckning öfver en del af Nordens fastland. Öfvers. af K. Vet.-Akad. Förh. 1862. N:o 8. pp. 463–468.

This paper gives further particulars of the distribution of the three species of Amphipods mentioned in the author's previous paper (see Note on Lovén, 1861), and compares the shape and size of various specimens of the fresh-water *Gammarus loricatus*, with a specimen from Spitzbergen.

1862. Meyer, H. Adolph, und Möbius, Karl.

Kurzer Ueberblick der in der Kieler Bucht von uns beobachteten wirbellosen Thiere, als Vorläufer einer Fauna derselben. Archiv für Naturgeschichte. Acht und zwanzigster Jahrgang. Erster Band. Berlin, 1862. pp. 229–237.

Of Amphipoda they mention *Gammarus locusta*, Montagu, "*Gammarus Sabinei*," Leach, two species of "*Amphitoë*," "*Leptomera pedata*, Müll.," and "*Caprella linearis*, Hbst."

1862. Milne-Edwards, Alphonse.

Notes sur l'île de la Réunion, par L. Maillard. Faune carcinologique par M. Alph. Milne-Edwards. Annexe *F*.

It may save trouble to future enquirers to quote the negative observation in this work; "il est aussi à noter que, dans les collections que nous avons pu consulter, il ne se trouve aucun Amphipode." Milne-Edwards suggests that new researches might well be undertaken to fill up this and other lacunæ.

1863. Gerstaecker, A.

Bericht über die wissenschaftlichen Leistungen im Gebiete der Entomologie während des Jahres 1862. Archiv für Naturgeschichte. Berlin, 1863. Crustaceen. pp. 566–598.

1863. BATE and WESTWOOD.

A history of the British Sessile-eyed Crustacea. Part XI., April 1, 1863. Part XII., August 1863. pp. 481–507, and (Vol. II.) pages 1–64. London.

At page 490, the species *Dryope crenatipalma*, Spence Bate, is renamed *Dryope crenatipalmata*. At page 497, a species is given as *Corophium bonellii*, Milne-Edwards, which Norman regards as unquestionably the female of *Corophium crassicorne*, Bruzelius. To the *Corophium bonellii* here figured and described, *Corophium spinicorne*, Sp. Bate, is made a synonym. *Chelura terebrans* is misprinted as *Chelura terebans*, and the figures of the gnathopods are wrongly lettered.

At page 51 (Vol. II.) the genera *Podalirius* and *Ægina* of Krøyer are rejected, but on insufficient grounds, so that for *Caprella typica* (page 75), *Podalirius typicus*, Krøyer, must be reinstated.

Cyamus erraticus, Roussel de Vauzème, is, at page 86, regarded as a synonym of *Cyamus ceti*, Linn., but erroneously in the opinion of Lutken, who also considers it rash to include *Cyamus oralis* and *Cyamus gracilis*, as is here done, in the British Fauna. (N.B.—Part XIII. containing pages 65–112 was published July 2, 1866. The Amphipoda end at page 98. For the Appendix see under 1868. The intervening parts containing the Isopoda were published—Part XIV., October 1, 1866. Part XV., December 2, 1866. Part XVI., May 1, 1867. Part XVII., June 1, 1867. Part XVIII., August 1, 1867. Part XIX., October 1, 1867. Part XX., April 1, 1868. Part XXI., August 1868.)

1863. CARUS and GERSTAECKER.

Handbuch der Zoologie. 1863.

Mayer notes the erroneous statement, vol. ii. p. 363, that the mandibular palp is wanting in *all* the Caprellidæ.

1863. CLAPARÈDE, JEAN LOUIS RENÉ ANTOINE EDOUARD, born 1832 (Hagen).

Beobachtungen über Anatomie und Entwickelungsgeschichte wirbelloser Thiere an der Küste von Normandie angestellt von Dr A. René Edouard Claparède. Mit 18 Kupfertafeln. Leipzig, 1863.

Pages 101–102 contain the section "Ueber die Blutbahnen bei den Caprellen," illustrated by Taf. xvi. Fig. 17–18." He says that in all the Caprellæ he examined the arterial current of the blood took its course along the side of the foot occupied by the flexor muscles, and the venous current along the extensor side; he points out that Frey and Leuckart were in error in saying that the whole arterial stream ran to the end of the leg, there to bend round into the venous stream. "Am peripherischen Ende jedes Fussgliedes (vgl. Fig. 17) spaltet sich nämlich die arterielle Blutströmung in zwei Zweige, wovon einer als arterieller Strom in das folgende Glied dringt, während der andere sofort umbiegt und auf der Streckseite in den venösen Strom übergeht." The arterial and venous currents are kept separate, he says, in the long legs by a very transparent membrane, in which he detected an elongate sharply defined opening, just where one part of the blood-corpuscles passed over from the arterial into the venous stream. On this subject Delage, p. 130, says in 1881, "dans les pattes, les vaisseaux afférents sont placés du côté de l'extension. Ils suivent donc le bord supérieur dans les deux premiers paires de pattes, et l'inférieur dans les trois dernières paires. Chacun

se continue au sommet de l'appendice avec le vaisseau efférent correspondant qui suit le bord opposé, et communique avec lui en plusieurs points de son trajet par de petites échappées qui s'ouvrent dans les lacunes du membre." Mayer observes that in the hind legs of *Caprella* the back-currents are not nearly so frequent as Claparède might lead one to suppose, since many blood-corpuscles, which disappear between muscles and seem to pass over into the venous division, circle round one muscle or another, and win their way back into the arterial main stream.

1863. Kinahan, John Robert.

Notes on the Marine Fauna of the Coast of Clare. (Read before the Natural History Society of Dublin, June 21, 1861). The Dublin Quarterly Journal of Science, No. IX. January, 1863. London. pp. 7–11.

"The only Amphipod I could meet in this [the littoral] zone," the writer says, "after much research, was *Orchestia littorea*, although *O. Mediterranea* occurs abundantly in Dublin and Plymouth. In the other zones were met, along with a multitude of others, *Caprella tuberculosa*, *Nœra bicuspidata*, *Amphitoe rubricata* and *littorina*, Lestrigonus falcatus; but I met with no specimen of *Gammarus palmatus*, although this latter occurs at Dublin."

1863. Lorenz, Jos. Rom.

Physicalische Verhältnisse und Vertheilung der Organismen im Quarnerischen Golfe. Wien. 1863.

Twelve species of Amphipods are named as distributed in the Quarnero, from the surface down to 45 fathoms. See pp. 288, 293–295, 303–326, 349.

1863. Packard, Alpheus Spring, Jr., born February 10, 1839 (S. I. Smith).

A list of Animals dredged near Caribou Island, Southern Labrador, during July and August, 1860. The Canadian Naturalist and Geologist. December, 1863. Vol. VIII. No. 6. pp. 401–429.

At page 419 he mentions "*Unciola irrorata* Say. *Anonyx* sp. In 15 feet gravel. *Anonyx* sp. *Ampeliscus pelagica* Stm. *A. Eschrichtii* Kr. *Gammarus purpuratus* Stm. In 10 feet mud and sand. *G. mutatus*, Liljeborge, (G. pulex). Occurs as in Maine."

At page 425, in "a List of the Invertebrata collected at Anticosti and Mingan Islands, by Messrs A. E. Verrill, A. Hyatt, and N. S. Shaler, in 1861," he mentions "*Gammarus mutatus* Leily. Low water, abundant." "*Caprella*. Two species, 20 feet, common. *Calliope laviuscula*. Magdalen Isles. Abundant at the surface of the water in the caverns under eroded cliffs. *Themisto* sp. Anticosti, common."

In regard to the typographical errors, see Note on Packard, 1867. The lists, he says (of course with no special reference to the Amphipoda), "seem to affords very satisfactory evidences that there are three distinct assemblages of marine invertebrates intermingled on the coast of Southern Labrador." See also Note on S. I. Smith, 1883.

1863. Sars, M.

Zoologiske Notitser fra Christiansund og Bejan. Nyt Magazin for Naturvidenskaberne. Tolvte Binds tredie Hefte. Christiania, 1863.

At page 290 he records "*Ægina spinosa* A. Boeck. Ikke sjelden mellem Sertulariner paa 30-40 F. D. ved Bejan. Det levende Dyrs Farve er hvidagtig og stærkt marmoreret eller plettet med rustbruunt, Øinene minierøde."

1863. Sars, Georg Ossian, born 1837 (G. O. Sars).

Beretning om en i Sommeren 1862 foretagen zoologisk Reise i Christianias og Trondhjems Stifter. Nyt Magazin for Naturvidenskaberne. Tolvte Binds tredie Hefte. Christiania, 1863. pp. 193–252.

Pages 205–212 relate especially to the fresh-water Amphipoda observed on this journey. First Sars discusses *Pontoporeia femorata*, Kroyer, Var., to which he strongly inclines to make *Pontoporeia affinis*, Lindström, a synonym. Secondly, he gives a full description of a species under the following heading, "*Gammarus pulex* De Geer, an a specie vulgo hoc nomine descripta diversus?" As to its *habitat* he says, "har jeg altid kun truffet vor Gammarus in storre stillestaaende Vande, aldrig i Elve." If it should prove a distinct species, he proposes to name it in correspondence with its habitat *Gammarus lacustris*, a name which he afterwards changed to *Gammarus neglectus*. Thirdly, he describes "*Gammarus cancelloides* Gerstfeldt, Var. (?)." This form, he says, had been already described by A. Boeck as a new species, under the name *Gammarus quadrispinosus*. It is rather in deference to Lovèn's opinion, than upon his own judgment, that he hesitates to accept Boeck's view.

1863. Stimpson, William.

Synopsis of the Marine Invertebrata collected by the late Arctic Expedition under Dr. J. J. Hayes. From Proceedings of the Academy of Natural Sciences of Philadelphia, May, 1863.

The Amphipods recorded are *Anonyx ampulla*, Kroyer, which is a synonym to *Anonyx nugax*, Phipps; *Pherusa tricuspis*, n. s., which is identified by Boeck with *Amphithoë fulvocincta*, M. Sars, 1858, under the name *Halirages fulvocinctus; Gammarus locusta*, J. C. Fabr. and *Themisto arctica*, Kroyer? *Gammarus pulex*, Stimpson, from Grand Manan, is here placed as a synonym to *Gammarus locusta*, Fabr.

1864. Bate, C. Spence.

Characters of New Species of Crustaceans discovered by J. K. Lord on the coast of Vancouver Island. [From the Proceedings of the Zoological Society of London. December 13, 1864.] pp. 662–668.

A new species "*Mæra fusca*," is thus described:—"The body is long and slender; the superior antennæ are about half the length of the animal, the peduncle being scarcely longer than

the flagellum; the secondary appendage being half the length of the primary, the second joint of the peduncle being about the same length as the first. Second pair of gnathopoda having the propodos large; palm without teeth, and defined by a small pointed process. Posterior pair of pereiopoda having the posterior margin of the base smooth.

"In its general appearance this species bears a near affinity to *Mœra grossimana*, as well as to *M. tenella*, from the Feejee Islands, the only appreciable distinctions being in the shorter length of the second joint of the antennæ, the absence of teeth from the palm of the hand in the second pair of gnathopoda, and in the even margin of the last (the only remaining) pair of pereiopoda, and perhaps also in the shortness of the peduncle of the ultimate pair of pleopoda." Habitat, a sponge in Esquimalt Harbour.

Tanais loricatus, n. s., is also described in this paper.

1864. Costa, Achille.

Di due nuove specie di Crostacei Amfipodi del golfo di Napoli. Annuario del Museo zoologico della R. Università di Napoli per Achille Costa. Anno II. 1862. Napoli, 1864. pp. 153–157.

He first describes "Ampelisca rubella, *nob.* Tav. II. fig. 7. *A. saturate rosea; antennis capite thoraceque parum longioribus, subæqualibus; scapo in superioribus vix quartum, in inferioribus tertium totius antennæ formante: pedibus primi et secundi paris subcylindraceis, longe pilosis (secundi gracilioribus paullumque longioribus), ungue arcuato, infra dentato; tertii et quarti articulo secundo et quarto brevissimis, ungue recto acutissimo; quinti et sexti articulo primo valde dilatato, orbiculari-cordato, ungue minutissimo retrum verso; septimi coeteris brevioribus, articulo primo minus elato, inferius lobato-producto, articulis 2–5 brevibus subæqualibus, ungue spurio, obtuso; lamina caudali ovato-elliptica, postice profunde scissa.*—Long. mill. 7." He says that from *Araneops diadema* and *Araneops longicornis*, the two species of *Ampelisca* which he had previously described from the Gulf of Naples, the present species differs sensibly, in colour, smaller size and other more important organic characters. He gives a fuller description in Italian.

He next describes "Protomedeia fasciata, *nob.* Tav. II, fig. 8. *P. albida, fasciis fuscis nigro punctatis, antennis subæqualibus, scapo superiorum illo inferiorum breviore; pedibus thoracici quinti, sexti et septimi paris articulo primo margine integro.*—Long. mill. 7–8." It has, he says, great affinity with *Protomedeia hirsutimana*, Bate and Westwood, but differs in having the first joint of the fifth pair of feet not serrate, in the distribution of the hairs (peluria) of the feet of the second pair and in the antennæ. It keeps its colour in alcohol.

1864. Costa, Achille.

Di alcuni crostacei e di un distomideo parassito degli acalefi. Rendiconto della R. Accademia delle Scienze Fisiche e Matematiche di Napoli. Fascicolo 4°—Aprile 1864.

Costa here notices that in 1850 Natale had placed Cocco's *Orio ornithoramphus* in a new genus, as "*Ornithoramphus Coccoi.*" With this Costa himself proposes to arrange three new species in two new genera, forming a little natural group, the Ornitoramfini. The genus *Natalius* is thus defined:—

"*Corpus elongatum, dorso rotundatum. Caput antrorsum ad rostri instar conice productum, rostro infra canaliculato. Antennæ duo, infra rostrum in canaliculo insertæ, minutæ. Oculi elongati, subreniformes. Palpi maxillares duo, corporis dimidium longitudinem*

superantes, gracillimi, trigeniculati. Pedes primi et secundi paris minuti, validiusculi, subprehensiles;—tertii et quarti cæteris longiores, gracillimi, filiformes—quinti, sexti et septimi normales. Pedes spurii primi, secundi et tertii segmenti abdominalis biremes, remis setosis, setis utringue fimbriatis—quarti, quinti et sexti stylis biarticulatis." The type species, *Natalius candidissimus*, A. Costa, is defined as follows:—"*N. albus, immaculatus, oculis tantum rubris, antennis sex-articulatis, articulo primo valde incrassato, setoso; pedibus primi et secundi paris carpo elongato, infra in spinam validam antrorsum producto; manu cylindracea, ungue parum arcuata; tertii paris illis quarti paullo longioribus; illis quinti, sexti et septimi longitudine decrescentibus, margine antico minutissime serrulatis; articulo primo parum dilatato; pedibus spuriis quarti, quinti et sexti segmenti abdominalis æque terminatis. Longit. millim.* 13."

The genus *Natalius* may perhaps be identical with *Oxycephalus*, M.-Edw., with which Carus doubtfully unites it, citing the *palpi maxillares duo* as "[*? antennæ II.*]," but that they are the lower antennæ is beyond question. The genus might be distinguished from *Oxycephalus* on the ground of its subprehensile gnathopods, did not the description of the type species indicate that they are in fact complexly chelate. The species *Natalius candidissimus*, Carus gives doubtfully as a synonym of *Oxycephalus similis*, Claus, 1879; but except that the specimens were taken in the same waters, the authors do not happen to take any common characters, on which a comparison can be founded, unless the slenderness of the first and second peræopods be considered such. It is strange that Costa makes no reference to *Oxycephalus*, and stranger still that he does not refer to *Erpetoramphus costæ*, described by de Natale, 1850, in a letter to Costa, beginning "Carissimo Achille."

The genus *Carcinornis*, A. Costa, is thus defined:—

Corpus elongatum, compressum, dorso subcarinatum. Caput antrorsum ad rostri instar conice productum, rostro infra canaliculato. Antennæ duo, infra rostrum in canalicula insertæ, minutæ. Oculi orato reniformes. Palpi maxillares minutissimi, quadriarticulati, haud fracti. Pedes primi et secundi paris minuti, validiusculi, prehensiles—tertii et quarti filiformes—quinti, sexti et septimi normales. Pedes spurii primi, secundi et tertii segmenti abdominalis biremes, remis setosis, setis fimbriatis—quarti, quinti et sexti stylis biarticulatis." The type species, *Carcinornis acutirostris*, A. Costa, is described as follows:—"*C. albus, utrinque vitta late purpurea per totum fere corpus excurrente notatus; capite cum rostro tertiam fere totius corporis partem formante, rostro acuminato; antennis setaceis; pedibus tertii et quarti paris subæqualibus—quinti, sexti et septimi longitudine decrescentibus, margine antico minutissime serrulatis, articulo primo modice dilatato; pedibus spuriis quarti, quinti et sexti segmenti abdominalis fere æque terminatis. Longit. millim.* 5–6." The second species, *Carcinornis inflaticeps*, A. Costa, is very briefly described in this way:—"*C. capite inflato, cum rostro minus acuminato quartum totius corporis partem formante; cæterum præcedenti similis. Longit. millim.* 5–6."

The genus *Carcinornis*, if really distinct, may eventually be identified by the coloration assigned to the type species. *Carcinornis inflaticeps* is suggestive of *Oxycephalus typhoides*, Claus, from the harbour of Messina, which has been already mentioned (p. 241) for comparison with *Ornithoramphus coccoi*, de Natale.

1864. GRUBE, A. E.

Beschreibungen einiger Amphipoden der istrischen Fauna. Archiv für Naturgeschichte. XXX. Jahrgang. I. Bd. 1864. pp. 195–213. Taf. V.

He here renames several of the species described by him in 1861; see Note on Grube, 1861. He says that the Amphipod, which Spence Bate treats as Rathke's *Dexamine tenuicornis*,

differs from it in several respects. He figures as a new species *Iphimedia multispinis*, and describes it in great detail. It seems closely to resemble *Iphimedia eblanæ*, Spence Bate, which is itself probably a form of *Iphimedia obesa*, Rathke.

The genus *Colomastix*, Grube, 1861, is here more fully defined :—

"*Corpus* subteres, depressum, postice attenuatum, coxis humilibus. *Antennæ* breves, fortes flagellis maxime obsoletis vel nullis, *superiores* inferioribus vix longiores, flagello secundario nullo. *Pedes maxillares* exungues. *Pedes paris* 1mi tenues, exungues, 2di fortiores, subchelati. *Pedes spurii* omnes biramei, spinulis nullis, ramo paris 3ii exteriore neque uncinato, neque uncinis armato. *Telson* simplex, laminare." The species *Colomastix pusilla* is partly figured.

The new genus *Icridium* is thus defined :—

"*Corpus* depressum ex ovali oblongum, postice elongatum. *Antennæ* breves, articulis paucis, *inferiores* superioribus breviores, tenuiores. *Caput* (deorsum visum) quadrangulum, angulis anterioribus prominentibus, oculos ferentibus. *Pedes omnes* ambulatorii, longitudine sensim crescentes. *Postabdomen* ex segmentis 5 compositum, *appendices anteriorum* 4 biramcæ, setigeræ, *segmenti* 5ti brevissimæ, simplices esetes. Telson nullum." The type species, *Icridium fuscum*, Grube "(Sitzungsberichte der Schles. Gesellsch. vom 18ten Februar 1863)," is described and figured. The specimen, 3·5 mm. in length, a female with young in the brood-pouch, was taken at Neresine on the Island of Lussin. Compare the Notes on Montagu, 1808, Guérin, 1836, Spence Bate, 1865, for the affinity of this genus with *Oniscus testudo*, Montagu, and *Phlias*, Guérin.

1864. GRUBE, ADOLPH EDUARD.

Die Insel Lussin und ihre Meeresfauna. Nach einen sechswöchentlichen Aufenthalte geschildert von Dr. Adolph Eduard Grube. Breslau, 1864.

A list of the Amphipoda observed is given on pages 72 to 75.

A new species is described as follows :—"*Kroyeria* Sp. B. ? *Kr. haplocheles* Gr. n. sp. ? Hat den Habitus einer Kroyeria, würde sich aber von den anderen Arten dieser Gattung dadurch unterscheiden, dass der Carpus des zweiten Fusspaares in keinen unteren Fortsatz ausläuft, die schmale Scheere also einfach ist, auch durch die beiden stachelartigen Zacken des Telson ; allein das 7. Fusspaar ist abgebrochen, und es bleibt daher unsicher, ob dies Thier überhaupt zur Gattung Haplocheles [Kroyeria] gehört ; Lussin." In this passage Haplocheles is evidently a slip of the pen, *Kroyeria* is a mis-spelling of *Kroyera ;* for the position of *Kroyera* itself see Note on Spence Bate, 1858. Under "*Megamoera* Sp. Bate," he places *Ceradocus orchestipes*, A. Costa, of which "die Antennen sind roth, der Hinterrand der 6 letzten mit Extremitäten versehenen Segmente läuft in einen Rückendorn, am zehnten auch seitlich in Zähnchen aus." The observation is added that, "Die Gattung Ceradocus von A. Costa lässt sich nach den von ihm aufgestellten Charakteren nicht halten und es liegt keine Nothwendigkeit vor, sie neu zu begründen ; wenn man bei ähnlicher Beschaffenheit der Antennen und der Hand des zweiten Fusspaares wie billig, das Hauptgewicht auf die Beschaffenheit des dritten Paares des Springfüsse legt, so lässt sich dieser Amphipode der Gattung Megamoera unterordnen, deren bei Spence Bate abgebildete Arten allerdings sämmtlich keinen Rückendorn auf den hinteren Segmenten besitzen, sich aber durch den gezähnelten Hinterrand an dem Seiten- oder Hüfttheil des zehnten Segmentes auszeichnen. Die Gattung Melita, deren hintere Segmente bei mehreren Species Rückendornen tragen, zeichnet sich durch die ungleiche Grösse der Aeste des letzten Springfusspaares aus, und die Einordnung des in Rede stehenden Amphipoden in diese Gattung würde die Umänderung eines sonst durchgreifenden Gattungscharakters erfordern ; ich muss hierin Herrn Professor Heller beistimmen."

Under *Cerapus* Say, he thus describes "*C. latimanus* Gr. n. sp. Jahresbericht d. Schles. Gesellsch. für 1863. Zeigt grosse Uebereinstimmung mit dem Männchen von *C. abditus* Templet. (Spence Bate Brit. Sessil-eyed Crust. I. p. 455. Fig.), aber die Hand des zweiten Fusspaares ist über halb so breit als das vorhergehende Glied, ihr Unterrand nur mit 1 zwischen die beiden vorderen Zacken desselben eingreifenden Vorsprunge versehen, sonst glatt und die flach sichelförmig gestaltete Klaue vom Grunde an allmälig verjüngt zulaufend. Die Länge von *C. abditus* wird auf etwa 1½ Lin. angegeben, unser Cerapus misst 5 mill.; bei Neresine gefunden." Under *Caprella* Lam., he describes "*C. inermis* Gr. n. sp. ohne alle Rückenstacheln und Höker, der oben gewölbte Kopf mit dem ersten Segment zusammen beinahe ebenso lang als das zweite, die oberen Antennen etwa nur ⅕ kurzer als der Körper; ähnelt der *C. robusta* Dana, doch ist der Unterrand der länglich ovalen Hand des zweiten Fusspaares zahnlos; die ähnlich gestaltete Hand des ersten ist wenig kleiner, das letzte Fusspaar war nicht erhalten. Länge etwas über 3 mill.; Lussin piccolo." Mayer thinks that this may just possibly be the young of *Caprella acutifrons*, Latreille.

1864. LEYDIG, FRANZ.

Vom Bau des thierischen Körpers. Handbuch der vergleichenden Anatomie. Tübingen, 1864.

On plumose hairs, p. 35, n. 2; on olfactory tubes and calecoli, pp. 98, 99, n. 4; on the brain of the Arthropoda, p. 185.

1864. MÜLLER, FRITZ.

Für Darwin. Leipzig, 1864. 8 maj. m. 67 Holtzschn.

Facts and arguments for Darwin, by Fritz Müller. With additions by the Author. Translated from the German by W. S. Dallas, F.L.S., &c., with illustrations. London; Murray, 1869.

In this translation of the celebrated work, Für Darwin, are figured *Melita exilii*, n. sp., "*Orchestia Darwinii*," n. sp., two forms of the chelæ of the male of this species, portions of the penultimate peræopods of "*Melita Messalina*" and "*Melita insatiabilis*," an embryo of a *Corophium*, portions of the legs of "*Hyperia Martinezii*," n. sp., and the second gnathopod of the male and of the female of "*Orchestia Tucuratinga*," while mention is made of *Corophium dentatum*, n. sp., without either figures or description, and of "*Orchestia Tucurauna*," n. sp., which is apparently the same as "*Orchestia Tucuratinga*."

A protest may be entered against the inconvenient course of publishing new species at various points of a highly argumentative essay, especially when the descriptions are almost of necessity confined to those isolated characters with which the argument happens to be concerned.

Fritz Müller has found the secondary flagellum on the upper antennæ "in species of the genera *Leucothoë*, *Cyrtophium*, and *Amphilochus*, in which genera it was missed by Savigny, Dana, and Spence Bate." "A species proved by the form of the epimera (*coxæ* Sp. Bate) of the caudal feet (*uropoda* Westw.), etc., to be a true *Amphithoë* possesses it." "In many species of *Cerapus* it is reduced to a scarcely perceptible rudiment." "It is sometimes present in youth and disappears (although perhaps not without leaving some trace) at maturity, as was found by Spence Bate to be the case in *Acanthonotus Owenii* and *Atylus carinatus*, and I

can affirm with regard to an *Atylus* of these [Brazilian] seas, remarkable for its plumose branchiæ."

He regards the telson as a segment, notwithstanding its want of appendages. In favour of this view he says, "we have the relation of the intestine, which usually opens in this piece, and sometimes even traverses its whole length, as in *Microdentopus* and some other Amphipoda. In *Microdentopus*, as Spence Bate has already pointed out, one is even led to regard small processes of this tubular caudal piece as rudimentary members." He speaks of the appendages of the first three pleon-segments as being "reproduced in wearisome uniformity throughout the entire order" of Amphipoda. This remark is not very applicable to *Cerapus* (see S. I. Smith, 1880), and has a disadvantageous tendency to discourage the examination of these organs in other genera.

In "*Orchestia Darwinii*," n. s., he figures two forms of the powerful chelæ of the second pair of feet in the male, "two forms united by no intermediate terms." Faxon, on *Dimorphism in the Genus Cambarus*, 1884, thinks that possibly "these are to be explained in the same way as the two forms of the male *Cambarus*, which appear to be "alternating periods in the life of the individual," the one form assumed during the pairing seasons, the other in the intervals.

In *Melita Messalina*, n. s., and *Melita insatiabilis*, n. s., in the case of the females "the coxal lamellæ of the penultimate pair of feet are produced into hook-like processes, of which the male lays hold with the hands of the first pair of feet."

He remarks that generally throughout the Amphipoda the heart "extends in the form of a long tube through the six segments following the head, and has three pairs of fissures, furnished with valves, for the entrance of the blood, situated in the second, third, and fourth of these segments," as found by La Valette in *Niphargus* and by Claus in *Phronima*. Only in *Brachyscelus* he found the first pair of fissures wanting to the shortened heart.

"The Amphipoda," he says, "are distinguishable from the Isopoda at an early period in the egg by the different position of the embryo, the hinder extremity of which is bent downwards. In all the animals of this order which have been examined for it, a peculiar structure makes its appearance very early on the anterior part of the back, by which the embryo is attached to the 'inner egg-membrane,' and which has been called the 'micropylar apparatus,' but improperly as it seems to me." To this statement he appends a note, "Little as a name may actually affect the facts, we ought certainly to confine the name 'micropyle' to canals of the egg-membrane, which serve for the entrance of the semen. But the outer egg-membrane passes over the 'micropylar apparatus' of the Amphipoda without any perforation, according to Meissner's and La Valette's own statements; it appears never to be present before fecundation, attains its greatest development at a subsequent period of the ovular life, and the delicate canals which penetrate it do not even seem to be always present, indeed it seems to belong to the embryo rather than to the egg-membrane. I have never been able to convince myself that the so-called 'inner egg-membrane' is really of this nature, and not perhaps the earliest larva skin, not formed till after impregnation, as might be supposed with reference to *Ligia*, *Cassidina*, and *Philoscia*."

"The young animal, whilst still in the egg, acquires the full number of the segments and limbs." In the Hyperinæ, indeed, "the young and adults often have a remarkably different appearance; but even in these there is no new formation of body segments, and limbs, but only a gradual transformation of these parts." The sexual differences in the Amphipoda are also discussed.

1864. Norman, Alfred Merle, born August 29, 1831 (A. M. N.).

Report of Dredging Operations on the Coasts of Northumberland and Durham, in July and August, 1863. Edited by George S. Brady. Report on the Crustacea, by the Rev. Alfred Merle Norman, M.A. Transactions of the Tyneside Naturalist's Field Club, 1863–64. Vol. VI. Newcastle-upon-Tyne, 1864. pp. 183–187.

No new Amphipoda are included in the list of Crustacea. *Otus carinatus*, Bate, is recorded among those taken.

1864. Sars, G. O.

Beretning om en i Sommeren 1863 foretagen zoologisk Reise i Christiania Stift. Nyt Magazin for Naturvidenskaberne. Trettende Binds tredie Hefte. Christiania, 1864. pp. 225–260.

At page 231 he mentions, *Gammarus cancelloides*, Lov., as occurring in various localities, and his own *Gammarus lacustris* as a characteristic form for their Alpine regions, in still waters. He is confirmed in the view that it is distinct from *Gammarus pulex*.

1864. Stimpson, William.

Descriptions of new species of Marine Invertebrata from Puget Sound, collected by the Naturalists of the North West Boundary Commission, A. H. Campbell, Esq., Commissioner. Proc. Acad. Nat. Sci. Philadelphia. June 1864.

A note is prefixed saying—"The following descriptions are extracted, by permission, from the Zoological Report of the Boundary Commission. They were written in the year 1860, and accompanied by illustrative drawings of all the species, which, it may be hoped, will soon be published." Whether the hope has been gratified I am unable to say.

The first Amphipod described is "*Caprella Kennerlyi*," which Mayer considers indeterminate. *Amphithoë humeralis*, more than an inch long, a little resembles *Amphithoë falklandi*, Spence Bate, from the Falkland Islands, in the dilated first joints of the first and second peræopods. Of *Anonyx filiger* I give the description for convenience of comparison with the Challenger species:—"Head with a strong triangular process on each side beneath the base of the superior antennæ; extremity of this process not acute. Superior antennæ very short, about as long as the head, with a long thick pencil of hair on the inner side of each; basal joint large, with a strong protuberance above, forming a prominent angle at its anterior extremity; flagellum seven-jointed, the first joint constituting one-third of its length; accessory flagellum tri-articulate. Inferior antennæ longer than the body; the peduncle, however, constitutes but a small part of their length, being but little larger than the superior antennæ; the very slender filiform flagellum appears as if serrated above, but is not provided with calceolæ. The first pair of feet in our single specimen appear to be pointed and simple, the dactylus not being retracted against the manus, which has no palm. Second pair with a minute truncate hand, supporting a small tuft of hair at the base of the dactylus. The dorsum in this species is sharp, or carinated, but not dentated, being entire and smooth in outline for the greater part of its length, and similar in the thoracic and first three abdominal segments. There

is, however, a deep, triangular sinus between the third and fourth abdominal segments, the latter being strongly protuberant, projecting over the very small fifth segment. The second abdominal segment is subtruncate below, and has a deep semicircular sinus on the anterior lateral margin, near its lower extremity. Rami of the last pair of caudal stylets shorter than those of the second pair, and telson rather elongated and slit in two down the middle. Length about one-third of an inch. It resembles an English species of which a figure has been privately circulated by C. Spence Bate, Esq., under the name of *Lysianassa Chausica*, M.-Edw. Dredged in deep water by Lieut. White."

The *Lysianassa chausica* here referred to was afterwards identified by Spence Bate with *Lysianassa longicornis*, Lucas, as to which see Note on G. O. Sars, 1882.

Gammarus subtener has the "first, second and third joints of the abdomen armed above with a sharp central spine on the posterior margin, and with four or five minute spines, or sharp comb-like teeth on each side of the middle spine, the margin bearing these latter spines being a little concave. At the corresponding part of the fourth and fifth abdominal segments, there are also two or three spines similar to the central spine of the other segments though not quite so large." Stimpson thinks it no doubt closely allied to *Gammarus longicauda*, Brandt, a species which Spence Bate renames *Megamœra longicauda*, and inclines to identify with *Gammarus dentatus*, Kroyer. *Amphithonotus septemdentatus* is "strongly compressed and carinated, like *A. carinata*." *Amphithonotus occidentalis* is "closely allied to the Arctic *A. panopla*, Kr., and the east coast species, *A. cataphractus*, Stm., but differing from both in being more elongated, having less height and breadth." The generic name *Amphithonotus*, as already observed, is inadmissible, having lapsed as a synonym of *Dexamine* before it was adopted by Stimpson. Of the species which Stimpson here mentions for the sake of comparison, *Amphithoë carinata*, Kröyer, is now called *Atylus carinatus*, Fabr.; *Amphithoë panopla*, Kröyer, is called *Pleustes panoplus*, and *Amphithonotus cataphractus*, Stimpson, is called *Rhachotropis cataphracta*. In *Ampelisca pygetica* "the last three joints of the abdomen are separated from the preceding ones by a deep notch, and project into two sharp teeth."

1864. Zaddach, Ernst Gustav, born 1817, died 1881.

Ein Amphipode im Bernstein, entdeckt durch Herrn Pfarrer von Duisburg und beschrieben von G. Zaddach. Taf. 1. 12 pages. Schriften der königlichen physikalisch-ökonomischen Gesellschaft. 5. Jahrg. Königsberg. 1864.

To the existing fauna of the neighbourhood in which this fossil was found Zaddach ascribes seven species of Amphipods, viz., the fresh-water "*Gammarus fluviatilis*, Raj.," four species which he dredged in the Bay of Dantzig, at some distance from the coast, and only two, he says, which live near the coast, *Gammarus locusta*, Mont., and *Talitrus saltator*, Klein. Of these he says that they frequently let themselves be thrown by the waves on to the strand, where, by help of their styliform uropods, they make powerful leaps, or with great dexterity bury themselves in the wet sand in order to be washed back into the water by the next wave, or gather round the remains of a dead fish for a meal, but never go beyond the narrow selvage of shore which is regularly washed to a greater or smaller extent by the waves. In these remarks Zaddach can scarcely be accurate. The sand-hopper, *Talitrus (saltator) locusta*, lives at the edge of high water-mark, and may follow down the ebb and retreat before the flow of the tide, but does not surely play with the waves in the manner described. The dexterous delving in the sand seems also more appropriate to species of *Urothoë*, *Lepidactylis* and *Eurydice* than to the sliddering *Gammarus locusta*.

Zaddach supposes his species to be the first fossil Amphipod discovered, since, he says, the genus *Gampsonyx* Jord. from the carboniferous period, which Bronn mentions in his Lethæa geognostica, 1856, is remote from the present Amphipods, and represents a special order of Crustaceans intermediate between Amphipods, Stomatopods and Decapods, or rather antecedent to them all and belonging to a time when their several characters were not yet separated. He is apparently unaware of the Permian fossil, called *Palæocrangon problematicus* by Schauroth in 1854, and *Prosoponiscus problematicus* by Kirkby in 1857.

After a careful and detailed description of the fossil, Zaddach establishes for its reception a new genus, *Palæogammarus*, which he thus defines :—"Caput altius quam longius. Antennæ et superiores et inferiores validæ, scapis triarticulatis, longitudine subæqualibus, illæ flagello appendiculari ornatæ. Epimera longa, duo anteriora angustissima, primo cingulo dorsali subjecta, quartum maximum, apice duplo latius quam basi. Postabdominis segmenta anteriora propriis laminis lateralibus instructa. Pedes quarti paris infirmi, ad ambulandum apti, quinti et sexti paris coxis permagnis in laminas ovales mutatis, ceteris articulis gracilibus, unguibus minimis rectis." For this genus he would find a place among the genera *Gammarus*, *Pontoporeia* and *Talitrus*. In 1878, however, he recognises that the characters on which he had relied for separating it from *Gammarus* were probably only due to the accidental condition of the specimen. He speaks of the peduncles of the lower antennæ as triarticulate, but they are from his figures clearly of the ordinary structure, though the composite basal joint is not visible. The amber being found on the coast of Samland, he names the species *Palæogammarus sambiensis*, with this definition :—"antennis superioribus inferiores longitudine superantibus, inferiorum flagello ex octo articulis composito, segmenti undecimi et duodecimi margine dorsali spinis obsito, pedibus spuriis longitudine æqualibus, appendicibus in abdominis apice nullis." The absence of the terminal appendages, as he afterwards noticed, should not have been included in the specific character, that being almost certainly due only to the defectiveness of the specimen.

To the question how this broken Amphipod got into the amber, the answer is suggested that the amber-producing woods probably came down in former ages close to the sea-shore, and that the creature with the sand attached to it may there have been introduced into a mass of resin. In 1878, he says with regard to it, "die Uebereinstimmung zwischen der tertiären Art und einer jetzt lebenden lässt sich nicht nachweisen, aber wahrscheinlich ist jene den Arten Gammarus marinus, locusta, Edwarsii sehr ähnlich gewesen. Der Stammbaum unseres gemeinen Flohkrebses reicht also bis in jene längst vergangene Zeit hinauf, in der sich die oligocänen Schichten ablagerten." The fresh-water *Gammarus pulex* might well have been added to the list of species compared.

1865. BATE, C. SPENCE.

Crustacea. The Record of Zoological Literature. 1864. Volume First. London, MDCCCLXV. pp. 257–311. Amphipoda, pp. 287–289.

Grube's *Nicea istrica* is considered identical with *Nicea prevostii*, M.-Edw. *Anonyx filiger*, Stimpson, is said to be closely allied to *Lysianassa longicornis*, Lucas, "or L. chausica (Spence Bate), not *Atlibrotus chausicus* (Milne-Edwards)." "The female of the genus *Gammarella* approximates so nearly in form to *Crangonyx*, only having the eye coloured with black pigment, that we have little doubt," Spence Bate says, "of the near relationship of Professor Grube's *Gammarus recurvus* to *Gammarella normani*, which is probably the female of *G. brevicaudata*." *Iphimedia multispinis*, Grube, which Grube himself likens to *Iphimedia nodosa*, Dana, shows, in Spence Bate's opinion, "a closer approximation to *I. eblanæ*, the dorsal teeth being less strong (probably a sexual distinction)." The difference

of *Colomastix pusilla* ♀, Grube, "from *Cratippus tennipes* consists in the form of the first pair of gnathopoda, which in '*Colomastix* terminate in several curved spines, whereas in *Cratippus* it is scarcely subchelate.' Even this distinction as suggested by Prof. Grube, may be only of sexual importance; and we think it insufficient to warrant the formation of a new genus." It may be observed that *Colomastix* was not instituted in 1864, but in 1861, and therefore takes precedence of Spence Bate's *Cratippus*.

On *Icridium fuscum*, Grube, Spence Bate observes:—"There is a slight discrepancy between Prof. Grube's excellent figures and the description. First, the telson is undoubtedly present; and since the ante- and penultimate pairs of pleopoda are attached to one somite, we must rather consider that the two somites are fused into one than that one is wanting. We therefore perceive that one, instead of two somites, only is wanting; but it is contrary to previous observation that this deterioration takes place in the anterior portion of the pleon instead of the posterior; for undoubtedly one of the anterior pairs of pleopoda is the missing pair."

1865. Costa, Achille.

Sopra una specie mediterranea del genere *Lestrigonus*. (*letta nella tornata del di 14 febbrajo 1865*). Rendiconto dell' Accademia delle scienze fisiche e matematiche. Anno IV. Napoli, 1865. p. 34.

He mentions "*Lestrigonus Fabricii*" (Milne-Edwards) (no doubt meaning *Lestrigonus Fabreii*), from the Indian Ocean, *Lestrigonus rubescens* (Dana), from the Pacific, *Lestrigonus exulans*, from Chili, as the earliest known members of the genus, followed by "*Lestrigonus Kinahani*," Spence Bate, from the British waters. To this he considers a form recently taken in the Gulf of Naples upon a *Medusa* to be closely allied. The distinguishing characters he takes from the proportions of the upper compared with the lower antennæ, and from the form of the uropods. He thus describes the species:—"Lestrigonus mediterraneus, *nob.*:—*L. antennis superis inferioribus paullum brevioribus; pedibus spuriis quarti et quinti segmenti abdominalis stylis lanceolatis, externo parum longiore, in margine interno toto minute dentato-serrato; in margine externo integro; stylo interno margine utroque integerrimo; fusco-rufus, antennis, pedibus* (*articulo primo excepto*) *caudaque albidis.* Longit. millim. 5."

1865. Goës, Axel Theodor, born 1835 (Hj. Théel).

Crustacea amphipoda maris Spetsbergiam alluentis, cum speciebus aliis arcticis enumerat A. Goës. Tab. XXXVI.–XLI. [Acad. Scient. Suecicæ propos. die XI. Octobris 1865]. Öfversigt. af K. Vet. Akademiens Förhandlingar. 1865. pp. 1–20 (517–536).

From this brief but learned work notes will be quoted under the numbers which Goës attaches to most of the species he mentions.

He begins with the Gammaridæ:

1. *Pontoporeia femorata*, Kröyer. "Forma minor, depauperata = P. furcigera, Bruzel."

Opis typica, Kröyer, Nat. Tidsskr. 2. R. II, 46, " = Opis Eschrichti, Kröy., Nat. Tidsskr. I. R. IV, 149." This is now called *Opisa eschrichti*.

Lysianassa gryllus, Mandt. fig. 1, "*Eurytenes Magelhanicus*, Liljeborg." Why he rejects Lilljeborg's genus is not explained.

2. "*Lysianassa Vahli*," Kröyer, "in itinerariis areticis cum sequente omnino confusa, sub nomine Talitro nugace (Ross, Parry's attempt to reach the North Pole, 205), sive Gammaro nugace (Sabine, Append. to Parry's First Voy., 229) edita.—Var. segmenti abdominalis tertii angulo postico rotundato, neque truncato nec emarginato, statura minore."

3. *Lysianassa lagena*, Kröyer, "=*Cancer nugax*, Phipps." Of these, between three fathoms and sixty, there is "copia stupenda, eo ut, si perite ac prudenter in captura versaris, hos pelagi voracissimos vespillones molibus milliariis cadavere avium vel phocarum brevi e fundo elicere potes."

4. *Lysianassa tumida* (*Anonyx*), Kröyer, "=An. tumidus, Bruzel." "In spongiis et saeco branchiali ascidiarum vitam saepe degens."

5. "*Lysianassa Martensi*," n. s., fig. 2, which Boeck transfers to *Anonyx*.

6. *Lysianassa crispata*, n. s., fig. 3, considered by Boeck to be a synonym of his *Orchomene serratus*.

7. *Lysianassa producta*, n. s., fig. 4, identified by Boeck with the earlier *Anonyx pumilus* Lilljeborg, 1865, to which Goës himself says it is "proxima et vix distincta."

Lysianassa abyssi, n. s., fig. 5, called by Boeck *Hippomedon abyssi*.

8. *Lysianassa holbölli* (*Anonyx*), Kröyer. 9. *Lysianassa minuta* (*Anonyx*), Kröyer, "vix An. minutus, Sp. Bate. Cat. of Amphip." 10. *Lysianassa gulosa* (*Anonyx*), Kröyer.

11. *Lysianassa umbo*, n. s., fig. 6, by Boeck referred to his own genus *Orchomene*, by Sars, 1882, to *Lepidepecreum*, Bate and Westwood. A comparison of the description and figures of *Lepidepecreum carinatum*, Bate and Westwood, with those of *Lysianassa umbo*, Goës, excites the strong suspicion that they are the same species, and that the English authors have not noticed the boss (umbo) on the fifth side-plates, while the little two- to three-jointed accessory flagellum has been accidentally wanting in their specimens. The definition of *Lepidepecreum* will in that case need some alteration. The type species would still be *Lepidepecreum longicorne*, Sp. Bate, 1862, with *carinatum* and *umbo* for synonyms.

12. "*Lysianassa Edwardsi*" (*Anonyx*), Kröyer, "Nat. Tidsskr. 2 R. II. 1; Voy. en Scandin. t. 16 f. 1 (icone vix fida); *non* Sp. Bate, Brit. Sessile-eyed Crust. II. 94, *nec* Catalogue of Amphip. in Brit. Mus. 73, t. 11, f. 5."

13. *Lysianassa plauta* (*Anonyx*), Kröyer. 14. *Lysianassa litoralis* (*Anonyx*), Kröyer, "=Alibrotus litoralis, Sp. Bate."

15. *Lysianassa? cymba*, n. s., fig. 7. "Medium tenet inter Lysianassas et Stegocephalos." On this Boeck observes, "Whether this form belongs to *Lysianassa* or is an intermediate form between that and *Stegocephalus* I cannot decide as I have not seen the animal. Among the *Lysianassinæ* we have a form in which the back is carinate, *Orchomene umbo*, while I do not know of any with carinate back belonging to the *Stegocephalinæ*. The hand of the second gnathopods also refers this form to the *Lysianassinæ*, but the very elongate hand of the first gnathopods shows that it cannot belong to the genus *Orchomene*, which it otherwise resembles by its deep side-plates. Before it can be placed in a new genus of the *Lysianassinæ* fresh investigation is required."

16. *Stegocephalus ampulla* (*Cancer*), Phipps, "=Gammarus ampulla, Ross," "=Steg. inflatus, Kröy.," "=Stegocephalus ampulla, Bell." "Formæ duæ occurrunt:—Altera epimero quarto æque fere alto ac lato, articulo pedum sexti et septimi paris primo dilatato, angulo infero postico subrecto aut acuto.—Fig. 8. Altera epim. quarto latiore quam altiore, articulo pedis sexti primo angusto, angulo infero postico lobulo rotundato determinato, pedes septimi articulo eodem dilatato margine infero postico rotundato nec angulato. —Fig. 9. An differentia sexualis?"

17. "*Montagua Alderi*," Sp. Bate, called *Metopa Alderii* by Boeck.
18. *Montagua clypeata* (*Leucothoë*) Kröyer, called *Metopa clypeata* by Boeck.
19. "*Montagua Bruzelii*," n. s., fig. 10, "= Leucothoe clypeata, Bruz." See Note on Bruzelius, 1859.
20. *Montagua glacialis* (*Leucothoë*), Kröyer, called *Metopa glacialis* by Boeck.
21. *Otus carinatus*, Sp. Bate.
22. *Vertumnus cristatus*, Owen, "Acanthonotus, nomen generis piscium anno 1801 editum)."
23. *Vertumnus serratus* (*Oniscus*), Fabr., "= Amph. serra Kröy.," "= *Acanthonotus serra* Bruz."
24. *Vertumnus inflatus* (*Acanthonotus*), Kröyer, fig. 11.

"*Paramphithoë*, Bruz. A. Epimera quarta dilatata (Pleustes, Sp. Bate)."

25. *Paramphithoë exigua*, n. s., fig. 12, identified by Boeck with his *Amphithopsis glaber*, 1860, which he afterwards called *Pleustes glaber*.
26. *Paramphithoë media*, n. s., fig. 13, by Boeck called *Pleustes medius*.
27. *Paramphithoë panopla* (*Amphithoë*), Kröyer, "= Paramph. panopla Bruz.;" "= Pleustes tuberculatus S. Bate," called *Pleustes panoplus* by Boeck, 1876.

"B. Epimera quarta non dilatata.

"*a*. Caudæ appendix fissa aut incisa (*Atylus*, Leach—S. Bate)."

28. *Paramphithoë carinata* (*Gammarus*), Fabr., "= Atylus carinatus, Leach;" = Amphithoë carinata, Kröy.;" now accepted as *Atylus carinatus*.
29. *Paramphithoë Smitti*," n. s., fig. 14, by Boeck called "*Atylus Smitti*."
Paramphithoë inermis (*Amphithoë*), Kröyer, is mentioned.
30. *Paramphithoë fragilis*, n. s., fig. 16, "Forma Amphithonotis propinqua." In accordance with this suggestion Boeck calls it *Tritropis fragilis*, which will now become *Rhachotropis fragilis*.

"*b*. Caudæ appendix indivisa vel obsolete incisa [*Calliope*, *Pherusa*, Leach, et *Paramphithoë*, S. Bate]."

31. *Paramphithoë læviuscula* (*Amphithoë*), Kroyer, "= Amphithoë serraticornis, Sars, 1858; = Paramph. læviuscula, Bruzel.;" "= Calliope læviuscula, S. Bate."
32. *Paramphithoë bicuspis* (*Amphithoë*), Kröyer. See Note on Bruzelius, 1859.

Paramphithoë tricuspis (*Acanthonotus*), Kröyer.

Paramphithoë tridentata, Bruzelius. "An = Amphithoë macrocephala, Sars?" 1858.

33. *Paramphithoë fulvocincta* (*Amphithoë*), Sars, 1858, fig. 15; "= Pherusa tricuspis, Stimps.," 1863. 34. *Paramphithoë pulchella* (*Amphithoë*), Kröyer. 35. *Paramphithoë hystrix* (*Acanthosoma*), Owen.
36. *Amphithonotus aculeatus* (*Oniscus*), Lepechin, "= Talitrus Edwardsi," Sab., "= Amphithoë Edwardsi Owen."
37. "*Amphithonotus Malmgreni*," n. s., fig. 17. This in 1870 was made the type of a new genus, *Acanthostepheia*, by Boeck in the subfamily Oedicerinæ.
38. *Oediceros saginatus*, Kröyer, fig. 18. 39. *Oediceros propinquus*, n. s., fig. 19, by Boeck made a synonym of *Oediceros lynceus*, M. Sars, 1858.
40. *Oediceros longirostris*, n. s., fig. 20, called *Monoculodes longirostris* by Boeck.
41. *Oediceros affinis*, Bruzelius, Amphip. Gammar., "93, f. 18 (non rite delineata) secundus articulus pedunculi antennar. sup. apice interdum dilatato; rostrum variat, nunc leviter curvatum, nunc fere geniculatum; segmenta abdominis quatuor antica dorso interdum carinato.—Fig. 21 et 21^1." Boeck refers *Oediceros affinis*, Goës (*non* Bruzelius), partly to *Monoculodes norvegicus*, Boeck, 1860, and partly to *Monoculodes borealis*, Boeck, 1870, with which J. Sp. Schneider, 1883, agrees, but "non sine dubio," the geniculate rostrum represented in Goës' fig. 21^1 being the attribute of *Monoculodes borealis*.
42. *Oediceros brevicalcar*, n. s., Fig. 22, by Boeck named *Hadimedon brevicalcar*.
43. *Oediceros latimanus*, n. s., Fig. 23, by Boeck called *Monoculodes latimanus*.
44. *Oediceros obtusus*, Bruz., Amph. Gamm. "p. 92, f. 17. Alia forma etiam occurrit: secundo

antennar. supern. pedunculi articulo valde abbreviato, pedes ordinis tertii et quarti articulo quarto valde dilatato, unguis pedum 3, 4 et 5 obtusus, foliaceus, angustus elongatus.—Fig. 24 et 24'." See Note on Bruzelius.

The new genus *Syrrhoë* is thus described:—

"Frons producta, oculi oedicerorum, antennæ supernæ flagello appendiculari instructæ, mandibula palpo triarticulato."

45. *Syrrhoë crenulata*, n. s., Fig. 25.

Syrrhoë bicuspis, n. s., Fig. 26. This is identified by Boeck with the earlier *Tiron acanthurus*, Lilljeborg, 1865; Boeck calls attention to the fact that Lilljeborg's work is referred to by Goës, and must therefore have priority, though both authors published in 1865.

46. *Phoxus plumosus*, Kröyer. He also mentions *Phoxus Holbölli*, Kröyer, and *Bathyporeia pilosa*, Lindström, 1855, for this giving also a reference to "Lovén, Öfvers. af K. Vet. Akad. Forhandl. 1861?"

47. *Haploops tubicola*, Lilljeborg. "Ex abysso ad Aukpadlartok Groenlandiæ copiam magnam retulit Torell speciminum valde robustorum et oculis quatuor, duobus in vertice, duobus in angulo infero laterali antico capitis insignium,—ceterum cum nostra plane congruentium." Boeck refers to this statement by Goës as to the eyes, without being able to confirm it from his own experience, so that in his generic account of *Haploops* he writes "Oculi duo (qvatuor?)"; but he considers that the genus is distinguished from *Ampelisca* by other characters, especially the peculiar form of the last peræopods.

48. "*Ampelisca Eschrichti*," Kröyer, "=A. macrocephala Lilljeb." These two species are however, kept apart both by Boeck and J. Sp. Schneider.

49. "*Ampelisca Gaimardi*," Kröyer. 50. *Pardalisca cuspidata*, Kröyer. 51. *Eusirus cuspidatus*, Kröyer.

52. *Gammarus pallidus* (*Lilljeborgia*) Sp. Bate, "=G. fissicornis Sars," 1858; "=G. brevicornis Bruzel.;"—Fig. 27. "ad Spetsbergiam in sinu Storfjord paucos fundo argill. org. 5 prof. prehendit Malmgren 1864, validiores quam nostros quadruplo statura, fere pollicares, spinis segmentorum abdominis 4:ti et 5:ti sat longis surrectis, pedibus septimi ordinis valde incrassatis, oculis indistinctis." Boeck separates *Lilljeborgia pallida*, Sp. Bate, 1855, and *Lilljeborgia fissicornis*, M. Sars, 1858, but the distinctions are tolerably subtle. He assigns *Gammarus pallidus*, Goës, fig. 27, to the latter species.

53. "*Gammarus Loreni*," Bruzelius, by Bate called *Mæra loreni*. "*Gammarus Torelli*," n. s., Fig. 28, by Boeck called *Mæra torelli*.

54. *Gammarus dentatus*, Kröyer, "=G. Kröyeri Bell;" "=Megamæra dentata S. Bate." "Formæ duæ occurrunt paullum diversæ; vide Fig. 29 et 29'." By Boeck called *Melita dentata*.

55. *Gammarus spinosus*, n. s., Fig. 30, by Boeck called *Melphidippa spinosa*.

56. *Gammarus locusta* (*Cancer*) Linn., in the synonymy of which he mentions *Gammarus borcus*, Sabine; *Gammarus arcticus*, Scoresby; *Oniscus pulex*, Fabr., Fn. Gr. 1780; and says that it scarcely differs from *Gammarus sitchensis*, Brandt. He gives notes on its distribution, and remarks "Oculorum forma variat, nunc oblongo-reniformis, nunc angustissime linearis, nunc evanescentes."

57. *Gammarus loricatus*, Sabine, "=Gammaracanthus loric. S. Bate."

58. "*Gammarus Sabini*," Leach, "=Amathia Sabini S. Bate;" "=Cancer macrourus articularis, dorso carinato serrato, spinis caudæ bifidis Ström."

59. *Gammarus pinguis*, Kröyer.

60. *Autonoë macromyx* (*Gammarus*), Lilljeborg, "Forma arctica, elatior, manus ♂ secundi pedum ordinis subquadrata, margine postico crenis 5–6 obsoletis (nec tuberculis) spina angulari interdum evanescente, ungue crassiore atque breviore; antennæ pedesque omnino longiores.—Fig. 31." This is identified by Boeck with *Protomedeia fasciata*, Kröyer.

61. *Autonoë depressa*, n. s., Fig. 32, transferred by Boeck in 1870 to a new genus *Goesia*, near to *Leptocheirus*.

At this point Goës passes from the Gammaridæ to the Corophidæ.

Amphithoë reinhardi (*Photis*), Kröyer, " = Amph. pygmæa Lilljeb." Boeck restores the name *Photis reinhardi*, Kröyer.

62. *Podocerus anguipes* (Ischyrocerus), Kröyer. " Statura corporis atque forma antennarum valde variat."

63. *Erichthonius difformis*, M.-Edw. " = Podocerus Leachii Kröy.;" " = Cerapus difformis S. Bate, Brit. Sess.-eyed Crust. II, 457.—Validus, quam nostras duplo-triplo elatior."

Siphonœcetes typicus, Kröyer.

64. *Glauconome leucopis*, Kröyer, " = Unciola leucopis S. Bate."

In the Hyperidæ he gives

65. *Themisto libellula* (*Gammarus*), Mandt, " = Th. arctica Kröy.;" " = Th. crassicornis Kröy.;" " Antennæ interdum elongatæ, multiarticulato flagello.—Fig. 33, 33'." Among the places of capture he names " Finmarkiam (Malmgren), ubi alia etiam forma occurrit a typica paullum discrepans : pedes tertii et quarti articulo 4:to angustiore, art. quinto longiore ; pedes quinti septimis paullo breviores aut inter se longitudine æquales."

Themisto compressa, n. s., Fig. 34, 34', referred by Boeck to his new genus *Parathemisto*.

66. *Hyperia exulans* (*Lestrigonus*), Kröyer, " = Lestrig. exulans Sp. Bate, Brit. Sess.-Ey. Crust. I. [II]. 5 ; = L. Kinahani ibidem p. 8 ; ♀ = Hyp. oblivia Kröy. Grönl. Amphip., D. Vid. Selsk. Afh. 298, t. iv, f. 19 (*non* Sp. Bate et Westwood, Brit. Sess.-ey. Crust. II. p. 16) = H. medusarum Sp. Bate, Catal. of Amph. in Brit. Mus. 295, t. 49, f. 1.—An Hyp. galba Mont., Transact. of Lin. Soc. XI. 4 2, f. 2 et Sp. Bate et Westwood Brit. Sess-eyed Crust. I. [II]. 12?"

" Ad nostras oras alia etiam forma occurrit paullum diversa, pedum primi ordinis articulo quinto fere cylindrico undique setoso, ungue minuto." This variety Boeck identifies with his own *Hyperia spinipes*, 1860 ; the *Hyperia exulans* with *Hyperia medusarum*, O. F. Müller.

67. *Hyperia medusarum* (*Metoecus*), Kröyer, " = ? Cancer medusarum Müll.," 1776 ; " ? Oniscus medusarum Fabr., F. Groenl. 1780 p. 257 ; Ico prototypica ab his relata Strömi (Om Söndmör etc. I, t. 1, f. 12) non sat distincta." " ♂ antennis longissimis multiarticulatis." Goës notes of this and the preceding species, that they are found free as well as on Medusæ.

In the Dulichidæ, he mentions 68. *Dulichia spinosissima*, Kröyer.

In the Caprellidæ, he mentions 69. *Caprella septentrionalis*, Kröyer, " = Squilla lobata Fabr., Faun. grœnl. 1780, p. 248 (non Muller) ; = Capr. cercopoides White, Append. to Southerland's Journ. 203 f. 1 et p. 207 ; nunc tuberculatus nunc fere lævis."

70. *Caprella spinifera*, Bell, Append. to Belcher's list of Arct. Voy., p. 407. t. 35. f. 2.

1865. Gosse, P. H.

A Year at the Shore. London, 1865.

Pages 151–154 discuss some Amphipods. The habits of *Gammarus locusta*, "the common Locust Screw," and *Gammarus pulex* are mentioned, and some of Lovén's remarks are reproduced, in regard to the discovery of *Gammaracanthus loricatus*, Sabine, *Pontoporeia affinis*, Lindström, and *Gammarus cancelloides*, Gerstfeldt, in Lakes Wetter and Wener in Sweden.

1865. Heller, Camil.

Kleine Beiträge zur Kenntniss der Süsswasser-Amphipoden. Mit 1 Tafel: (Taf. 17.) (Aus den Verhandlungen d. k. k. zoologisch-botanischer Gesellschaft in Wien [Jahrgang 1865] besonders abgedruckt.)

The new species *Orchestia cavimana* is here described and figured. It was taken on Mount Olympus in Cyprus, at a height of 4000 feet by Dr. Kotschy. The new species, "*Gammarus Veneris*" was also taken by Dr. Kotschy in Cyprus, 50 feet above the sea. This species is said by Heller to be intermediate between *Gammarus marinus* and *Gammarus pulex*. In "a review of the hitherto known South European fresh-water amphipods," he says that "they all belong to the genus *Gammarus Fabric.*" He arranges them as follows:—

"A. First gnathopod somewhat larger than the second, telson simple, undivided; third uropod with a single ramus. (Subg. *Crangonyx*, Sp. Bate.)

"1. *G. recurvus.*

"AA. First gnathopod not larger than the second, telson deeply split, or double; third uropod with two rami:—

"*a.* First gnathopod almost as large as the second, eyes rudimentary, the three last segments of the pleon without bundles of spines, the outer ramus of the third uropod bi-articulate. (Subg. *Niphargus*, Sch.).

"2. *G. puteanus.*

"*b.* First gnathopod smaller than the second, eyes well developed. The three last pleon-segments with bundles of spines, the outer ramus of the third uropod uni-articulate. (Subg. *Gammarus*, Sp. Bate).

"α. The three first pleon-segments prolonged backwards to a pointed spine-tooth.

"3. *G. Roeselii.*

"β. The three first pleon-segments straight behind, without spine-tooth.

"† The outer ramus of the last uropod only a little longer than the inner.

"4. *G. pulex.*

"†† The outer ramus of the last uropod much longer than the inner.

"5. *G. pungens.*"

These divisions are founded on 1. *Crangonyx recurrus*, Grube; 2. *Niphargus* (*Gammarus*) *puteanus*, Caspary, with which Heller unites *Niphargus stygius*, Schiödte, and *Niphargus aquilex*, Sp. Bate; 3. *Gammarus roeselii*, Gervais, identified with *Squilla fluviatilis*, Rösel, and *Gammarellus pulex*, Herbst; 4. *Gammarus pulex*, Desmarest, identified with *Gammarus fluviatilis*, M.-Edwards, and 5. *Gammarus pungens*, M.-Edwards. Of this last he says that it closely agrees with his own new species *Gammarus veneris*, only that, according to M.-Edwards' short description, *Gammarus pungens* appears to have the inner ramus of the last uropod quite rudimentary. Of *Gammarus veneris* itself, Heller thus describes the last uropod, "ramus interior pedum sexti paris postabdominis exteriore multo brevior, ramis hirsutissimis." *Gammarus roeselii*, he says, "lebt in tiefen stehenden oder schwach fliessenden Gewässern. Ich kenne ihn aus der Umgebung von Salzburg, Wien und Ofen, in Tirol habe ich ihn noch nicht angetroffen."

1865. Lilljeborg, W.

Bidrag till kännedomen om underfamiljen *Lysianassina* inom underordningen *Amphipoda* bland kräftdjuren.

On the *Lysianassa magellanica* H. Milne Edwards, and on the Crustacea of the suborder *Amphipoda* and subfamily *Lysianassina* found on the coast of Sweden and Norway. By William Lilljeborg. With 5 Plates. Upsala, MDCCCLXV. (Nova Acta Reg. Societ. Scient. Upsal. IIIe Série.)

The two papers, written in different languages by the same author, are essentially the same. In the suborder Amphipoda Lilljeborg mentions as common to both the arctic and antarctic zones the genera *Orchestia*, Leach, *Anonyx*, Kröyer, *Iphimedia*, Rathke, *Atylus*, Leach, *Amphithoë*, Leach, *Hyperia*, Latreille, *Themisto*, Guérin-Méneville, *Cyamus*, Lamarck (properly Latreille). He speaks of *Themisto* and *Anonyx* as peculiar to the zones in question, but immediately after qualifies this statement. *Lysianassa magellanica*, he makes the type of a new genus *Eurytenes*, which he thus defines:—

"*Corporis forma crassa et robusta, epimeris magnis et pedibus brevibus. Antennæ superiores flagello appendiculari præditæ, pedunculo crasso et ejus segmentis 2:do et 3:tio brevibus, et flagelli segmento 1:mo longo. Antennæ inferiores segmento pedunculi 1:mo magno et inflato et extus visibili. Mandibulæ palpigeræ acie lævi et tuberculo molari magno instructæ, Maxillæ 1:mi paris palpo biarticulato angusto, apice duas vel tres setas vel aculeos minores mobiles gerente, et earum ramus interior latus et brevis et setis multis ciliatis instructus. Maxillipedum lamina trunci segmenti 2:di, sive lamina exterior margine interiore tenuissime noduloso, et eorum palpus quadriarticulatus et unguiferus. Pedes trunci sive thoracici 1:mi et 2:di paris subcheliformes, illi validi et breves, ungue bene evoluto, hi longiores et graciliores, ungue minutissimo. Reliqui pedes trunci forma solita, robusti. Laminæ branchiales simplices minimeque pectinatim plicatæ. Pedes caudales ultimi paris ramis lamellosis. Segmentum 7:mum sive ultimum caudæ profunde bifidum, laciniis acuminatis ad apicem vero non spiniferis.*—Tantummodo una species:—*Eurytenes magellanicus* (H. Milne Edwards)." The definition inserted in the Swedish paper adds to the account of the mandibulæ, "processu accessorio vero minimo et simplice," which in the English paper appears in the description of the species. The species is now known as *Eurytenes gryllus*, having been identified by Boeck with *Gammarus gryllus*, Mandt, (rather Lichtenstein in Mandt), 1822. A full and interesting account of the species is here given, with good figures, Plates I., II., III., figs. 19–22. Lilljeborg agrees with Spence Bate in numbering the limb-joints, not from the first free joint, but from the true first joint, "to which the gill-sack and lamina for covering the eggs are attached.

A tabular view of the families of the Amphipoda gives them in two groups; those in which "Pedum caudalium omnia paria adsunt—*Normalia*, S. Bate," are 1. Gammaridæ, Dana. 2. Orchestidæ, Dana. 3. Corophidæ, Dana. 4. Cheluridæ, Allman. 5. Hyperidæ, Dana. Those in which "Pedum caudalium unum vel pluria paria absunt—*Aberrantia*, S. Bate," are 6. Dulichidæ, Dana. 7. Caprellidæ, Dana. 8. Cyamidæ, Dana. The Hyperidæ are distinguished from the four preceding families by having the "maxillipedes imperfecti et palpo carentes." The Cheluridæ are separated from the three preceding by having the "Segmenta caudalia posteriora coalita;" but since the establishment of the genus *Goplana*, Wrześniowski, this character has lost some of its definiteness.

In a tabular view of the genera of the Gammaridæ, Lilljeborg introduces *Microplax* as a new name for *Iduna*, Boeck, *Iduna* being preoccupied, but *Liljeborgia*, Spence Bate, 1862, has the priority. *Odius* is substituted for *Otus* preoccupied, and *Calliopius* for *Calliope*

preoccupied. The genus *Tiron* is "typified" in a new species called *Tiron acanthurus*, and thus defined :—

"Forma capitis ex parte cum eadem gen. *Oediceri* congruit, antennæ superiores vero flagello appendiculari longo sunt præditæ, et pedes trunci 7:mi paris longitudine pedes anteriores æquant, et breves, crassi et unguiferi sunt. Pedes trunci 1:mi et 2:di paris graciles, ungue tamen non flexibili instructi. Segmenta caudalia superne in medio longitudinaliter carinata, carina ad marginem posteriorem segmentorum in aculeum, qui in segmentis 4:to et 5:to magnus est, et adhuc in segmento 6:to observatur, excurrente. Antennæ superiores longitudine pedunculo antennarum inferiorum æquales. Frons aliquanto producta, basin antennarum superiorum obtegens, rostro brevi sed acuto. Oculi rubri. Longitudo circ. 10 millim."

The new genus *Oediceropsis* is also typified by a new species, which, because the upper antennæ are particularly short, is called *Oediceropsis brevicornis*, with this definition :—

"Forma corporis eidem gen. *Oediceri* valde similis, caput tamen rostro caret, et pedes trunci 7:mi paris, qui longum et rectum unguem habent, et longi et graciles sunt, tamen pedibus anterioribus 6:ti paris non duplo—circ. sesqui—longiores sunt. Antennæ superiores non finem articuli penultimi pedunculi antennarum inferiorum assequuntur, et flagello appendiculari carent. Antennæ inferiores magnæ, fere pediformes, articulo penultimo pedunculi ceteris majore et ad apicem infra setam magnam gerente. Oris partes appendiculares et hujus et anterioris speciei structura solita. Pedes trunci 1:mi et 2:di paris forma inter se similes manu subcheliformi, ovali, carpo postice aliquantum producto. Pedes trunci 3:tii et 4:ti paris parvi et graciles. Segmentum caudale 7:mum integrum et parvum sed laminare. Pedes caudales ultimi ramis duobus angustis, fere æqualibus. Color flavescens; oculi rubescentes, sed parum visibiles. Longitudo circ. 8 millim."

In the subfamily Lysianassina Lilljeborg gives five genera, which correspond to thirteen out of the seventeen which Boeck has assigned to it.

Lysianassa, Milne-Edwards, he defines as follows :—

"*Pedes trunci s. thoracici 1:mi paris manu subcheliformi curvatos, ungue non flexibili, segmento 6:to sive manu apicem versus attenuato ibidemque basi unguis vix crassiore. Mandibulæ tuberculo molari minimo. Laminæ exteriores maxillipedum margine interiore nodulosa vel lævinscula.*" Within this he distinguishes three species thus :—

"*Lysianassa.* Segmentum 7:mum caudæ	fissum.	pectinatim plicatæ	1. *spinicornis* (A. Boeck).
	Laminæ branchiales	non plicatæ	2. *Vahli* (Kröyer).
	non fissum, margine posteriore convexo		3. *Costæ*, M. Edwards."

Of these the first is *Ichnopus spinicornis*, Boeck, 1860, the second was called "*Socarnes Vahli*" by Boeck in 1870, the third is the original type species of *Lysianassa*.

The second genus, *Eurytenes*, has been already described. The third genus, *Anonyx*, Kröyer, is thus defined :—

"*Pedes trunci* (*thoracici*) *1:mi paris manu subcheliformi armati, ungue flexibili, margine inferiore manus plus vel minus dejnito. Mandibulæ tuberculo molari mediocri vel magno. Laminæ exteriores pedum maxillarium margine interiore plerumque nodulose, raro dentato vel aculeato.*" To this he assigns the following fifteen species, 1. *Anonyx ampulla* (Phipps); Kröyer, Pl. iv. fig. 52, which is rather to be called *Anonyx ungæ*, Phipps; 2. *Anonyx longipes*, Sp. Bate, Pl. iii. figs. 23–31, called *Tryphosa longipes* by Boeck, 1870; 3. *Anonyx gulosus*, Kröyer, including his own *Anonyx norvegicus*, 1851, and the *Anonyx holbölli* of Bate and Westwood; 4. *Anonyx nanoides*, n. s., Pl. iii. fig. 32–34, called

Tryphosa nanoides by Boeck, 1870; 5. *Anonyx pumilus*, n. s., Pl. iv. fig. 35–41; 6. *Anonyx brachycercus*, n. s., Pl. iv. fig. 42–49, called *Menigrates brachycercus* by Boeck in 1870; 7. "*Anonyx Bruzelii*," Boeck, which is recognised as standing near *Anonyx gulosus*, and was subsequently regarded by Boeck himself as a variety only of that species, see the table of errata and addenda to De Skand. og Arkt. Amph.; 8. *Anonyx nanus*, Kröyer, by Boeck in 1870 called *Tryphosa nanus;* 9. *Anonyx pinguis*, Boeck, later called *Orchomene pinguis* by Boeck; 10. *Anonyx serratus*, Boeck, Pl. iv. fig. 50, afterwards called *Orchomene serratus* by Boeck; it is here identified with *Anonyx Edwardsii* (Spence Bate), but wrongly according to Sars; 11. "*Anonyx Edwardsii*," Kröyer, afterwards called *Onesimus edwardsii* by Boeck; 12. *Anonyx litoralis*, Kröyer, called *Onesimus litoralis* by Boeck; 13. "*Anonyx Hollböllii*," Kröyer, called *Hippomedon holböllii* by Boeck; *Anonyx denticulatus*, Spence Bate, is here said to be the male of this species; 14. *Anonyx obtusifrons*, Boeck, which was afterwards called *Menigrates obtusifrons* by Boeck; 15. *Anonyx tumidus*, Kröyer, Pl. iv. fig. 51, which Boeck calls *Aristias tumidus*. Boeck, it will be observed, requires seven genera for these fifteen, or perhaps thirteen, species. *Anonyx bruzelii* falls to *Anonyx gulosus* (*cicada*), and *Anonyx brachycercus* is considered by Boeck, in 1876, to be a synonym of *Anonyx* (*Menigrates*) *obtusifrons*. In Lilljeborg's synoptic table *Anonyx brachycercus* is separated from *Anonyx obtusifrons* by the maxillipeds. In *brachycercus* these have the outer plates large, "ultra medium articuli 3:tii palpi extensæ, ad marginem interiorem tantummodo apicem propius nodulosæ, nodulis discretis 4, et ad marginem exteriorem setam unam et pilos minimos gerentes," while in *obtusifrons* he finds from Boeck's description that these plates "have some few scattered coarse teeth on the inner margin." These delicate characters seem little suited for important subdivisions. I am inclined to think that the teeth on the inner margins of the outer maxilliped-plates are very liable to accident, so that their absence cannot always be depended on as characteristic.

The fourth genus, *Callisoma*, Costa, has the species *Callisoma kröyeri*, Bruzelius.

The fifth genus, *Acidostoma*, which is new, is thus defined:—

"*Forma corporis et antennarum cum genere Anonycis congruit, oris partes appendiculares tamen plane diversæ. Labii rami laterales angusti. Mandibulæ processu accessorio, maxillæ 1:mi paris palpo, et palpus maxillipedum ungue carentes, et hæ partes oris conjunctim acumen productum præbent. Pedes trunci 1:mi paris robusti, manu prehensili. Pedes 2:di paris graciles, ungue carentes.*" To this genus, as the type species, is referred *Anonyx obesus*, Sp. Bate, which is described and figured, Pl. v.

1865. Müller, Fritz.

Description of a new genus of Amphipod Crustacea. The Annals and Magazine of Natural History. Series 3. Vol. XV. 1865. pp. 276, 277. Pl. X.

The new genus, *Batea*, is thus defined:—"Antennæ simple. Coxa of the first pair of gnathopoda rudimentary, those of the second pair of gnathopoda and the first two pairs of pereiopoda largely developed. Coxa of the second pair of pereiopoda deeply excavated upon the upper part of the posterior margin. First pair of gnathopoda rudimentary, consisting of coxa and basis only; second pair of gnathopoda subchelate. Mandibles having an articulated appendage. Maxillipeds having a squamiform plate on both the basis and ischium joints. Fourth and fifth pairs of pleopoda with styliform rami, sixth pair with subfoliaceous rami. Telson single, deeply cleft."

"Species *Batea Catharinensis*, F. M."

Fritz Müller dates from Desterro, Brazil. He gives figures of the male, and notes in his

description several differences presented by the female. Among other points he mentions that "the first pair of gnathopoda are shorter in the male, with but few hairs near the top; they are as long as the basis of the second pair of gnathopoda in the female, slender, flexible, with long hairs on the anterior margin, and shorter curved hairs at the distal extremity."

1866. Bate, C. Spence.

Crustacea. The Record of Zoological Literature. 1865. Volume Second. London. MDCCCLXVI. pp. 306–366.

In reviewing Lilljeborg's work on the Lysianassina, Spence Bate remarks, "the closest inspection of specimens of *Caprella æquilibra* from the United States of America has not enabled us to distinguish it from specimens found at Hong Kong and England by so much as a variation that could be tortured into being of specific value. This, moreover, appears to be true of forms that we find described as specifically distinct; but as yet no forms have been determined by competent zoologists as specifically identical in both extreme zones, there being no intermediate locality in which they are known to exist." He thinks "the carcinologist may have confidence that the figure in the British Museum Catalogue fairly and faithfully represents the general form of the type specimen of *Lysianassa magellanica*." Part of the inferior antennæ "may have been hypothetically inserted." He draws the conclusion that Lilljeborg's identification cannot be maintained between his *Eurytenes magellanica* and the *Lysianassa magellanica* of Milne-Edwards. He compares the *Anonyx ampulla* of the British Sessile-eyed Crustacea with Kroyer's figure in Voy. Scand., pl. xiii. fig. 2, with which he thinks it identical.

Spence Bate objects to the placing of his *Anonyx obesus* in the new genus *Acidostoma* "as all the distinguishing conditions are changes in degree only."

1866. Costa, Achille.

Descrizione di una specie di *Cyamus* parassita de' Delfini. Annuario del Museo zoologico della R. Università di Napoli pel Cav. Achille Costa. Anno III.—1863. Napoli, 1866. pp. 82–83.

He notices that Guérin, in the Icon. Regn. Anim., figures a species of *Cyamus* parasitic on a species of *Delphinus*, which he calls *Cyamus delphini*, and which differs from the parasites on species of *Balæna* in important characters, and that Gervais and Van Beneden have proposed for it a separate genus *Isocyamus*, without however formulating the generic characters. As he has himself found a *Cyamus* differing apparently from Guérin's, he concludes that there must be more than one species parasitic on the *Delphini*. He describes and figures (pl. iv. fig. 2) the new species as *Cyamus chelipes*, remarking, "Ne possediamo un solo individuo femmina rinvenuto sopra un Delfino comune pescatosi nel golfo di Napoli. *Osservazioni*. Se la figura data dal Guérin del *Cyamus Delphini* è esatta, la nostra specie ne differisce per le antenne interne men lunghe, pe' piedi del primo pajo a mano prensile, per quelli del secondo proporzionalmente meno grossi e per una diversa forma delle mani de' medesimi, pel primo articolo de' piedi del quinto sesto e settimo pajo non fortemente intaccato nel margine posteriore." Lütken gives no opinion upon this species, probably not having met with the account of it.

1866. Dohrn, Anton, born December 29, 1840 (Paul Mayer).

Zur Naturgeschichte der Caprellen. Mit. Taf. XIII. B. Zeitschrift für wissenschaftliche Zoologie. Bd. XVI. 1. Heft. 1866. pp. 245–251.

Dohrn remarks, as Gosse had done before him, that Caprellæ can upon occasion swim with activity. In his account of the nervous system, he says that "the brain mass consists of two large, differently-formed swellings, of which the upper is considerably larger than the lower. The former shows three distinct sections, a larger upper, a central giving off the optic nerves, and a small anterior one. The upper mass is pierced by the two branches of the aorta, the lower by the œsophagus; behind this the broad œsophagean commissures pass obliquely backwards, entering the first mass of the ventral chain, which likewise consists of two coalescent ganglia. The hinder smaller ganglion belongs to the coalescent first peræon-segment and is considerably smaller than the anterior, properly subœsophagean ganglion." Mayer observes that the coalescence here spoken of is true of the genus *Proto*, but in most genera and species of the Caprellidæ, the ganglia in question come together without actually coalescing. Dohrn cannot agree with Frey and Leuckart in the view that the ganglion of the second peræon-segment is more powerfully developed than any other, although he thinks that no doubt the importance of the ganglia depends on the extent of the regions they have to supply. He studied the nerves in the young animal, but as a matter of fact in some adult Caprellæ the second pair of limbs are so greatly developed that the statement by Frey and Leuckart is just in accord with the general principle which Dohrn accepts. Dohrn found that the last peræon-segment and the rudimentary pleon, at any rate in the young animal, were without nerve-masses, but on the other hand he discovered that the last ganglion, in the sixth peræon-segment, corresponded not merely to two coalescent nerve-masses, but rather to five, some of which he naturally supposed were derived from the pleon. Mayer, investigating young animals of *Caprella* and *Protella*, has since seen "behind and between the two strong nerves that run from the seventh peræon-ganglion to the corresponding pair of legs, *no less than seven ganglia*, three pairs and an odd one. The second and third pairs rapidly unite into a single mass, and do not appear to give off any nerves. The last odd one shows traces of coalescence out of an original pair. It is the largest of the pleon-ganglia, and no doubt, as Mayer says, corresponds to the single ganglion which provides in the normal Amphipoda for the three segments preceding the telson.

Dohrn finds only two liver tubes in the Caprellidæ, and therefore concludes that when Spence Bate speaks of the liver in the Amphipoda as consisting of four tubes, it is an error of observation. The number, however, varies in different genera.

In treating of the circulation, Dohrn attributes to the heart five pairs of fissures instead of three. The first, he says, is in the cephalic segment, where the aorta parts from the dorsal vessel; the second, third and fourth lie in the middle of the corresponding segments. The fifth lies in the middle of the fifth segment at the end of the dorsal vessel. The fourth is by far the largest.

In regard to the sexual organs, Dohrn supposes, but erroneously, that there are two pairs of testes in *Caprella*, though in the other Amphipoda he is aware from concurrent testimony that there is but one pair.

1866. GRUBE, A. E.

Beiträge zur Kenntniss der istrischen Amphipodenfauna. Archiv für Naturgeschichte. Zwei und dreissigster Jahrgang. Erster Band. Berlin. 1866. pp. 377–417. Taf. ix. x.

Grube explains, to begin with, that he names the seven joints of the leg numerically according to their position, except the seventh, which for brevity he calls the finger (die Klaue). On the first joint his remark is that he reckons "das Basalstück, an welchem die Kieme und das zum Tragen der Eier bestimmte borstenrandige Blatt befestigt ist, und das zwar von der Epimeralplatte aussen überwachsen aber doch von dieser unterscheidbar ist, als 1tes Glied oder Hüftglied." He defines the Amphipoda genuina, the Gammarina, and the two families, Orchestidæ and Gammaridæ.

After discussing "*Orchestia littorea*," and "*Orchestia Montagui*, Aud.," Taf. ix. fig. 1, with some of their synonyms, Grube gives a definition of *Allorchestes*, Dana, including "Telson simplex vel bipartitum." To this genus he assigns 1. "*Orchestia Perieri*, Lucas," Taf. ix. fig. 2; 2. a new species, "*Allorchestes Helleri*," Taf. ix. fig. 3, which he had previously classed as "*Allorchestes imbricatus*, Spence Bate? juv.," but which is probably *Hyale nilsonii*, Rathke; and 3. a new species, *Allorchestes stylifer*, Taf. ix. fig. 4, "carpo . . satis lato, postice in processum styliformem curvatum exeunte," a peculiarity which, with some other slighter distinctions, separates it, he says, from *Amphithoë* (*Allorchestes*) *prevosti*, Milne-Edwards. He then gives a definition of *Nicea*, Nicolet, including "Telson profunde divisum," and, depending apparently only on comparative lengths of the antennæ for the generic distinction, he assigns his *Amphithoë* (*Hyale*) *istrica* to this genus as *Nicea istrica* ♂, Taf. ix. fig. 5. He describes a new species, *Nicea longicornis*, from a single female specimen, 4 mm. in length, having "antennæ superiores inferioribus paulo longiores et fortiores, usque ad segmentum 5tum pertinentes, articulis 14, 2do longitudine 1^{mi}, dupla 3^{ii}." It reminds him of *Calliope*, but for the last uropods, while *Gammarella* and *Crangonyx* are excluded on other accounts. The character of the antennæ at any rate seems little to accord with *Nicea* (*Hyale*), and, as no figure is given, it might be rash to suggest *Pherusa fucicola*, Leach, for this species, on the presumption of some error in Grube's description.

In defining the genus *Lysianassa*, Grube gives "Telson squamiforme integrum vel fissum," and in it describes, 1. *Lysianassa spinicornis*, A. Costa, Taf. ix. fig. 6; 2. ? *Lysianassa loricata*, A. Costa; 3. his own *Lysianassa ciliata*, Taf. ix. fig. 7, which has the "telson oblongum longitudine appendicum pedes bistyli 3^{ii}, usque ultra medium fissum," and is thereby excluded from the genus *Lysianassa* as generally defined, and from identity with *Lysianassa audouiniana*, Sp. Bate, as proposed by Heller; 4. *Lysianassa humilis*, A. Costa, which in Heller's opinion is probably the same as *Lysianassa costæ*, M.-Edw.; 5. *Lysianassa longicornis*, Lucas, Taf. ix. fig. 8, with remarks on the differences between the two sexes, extending not only to the size and shape and armature of the antennæ, but also to the form of the first gnathopods and of the telson. "Das Telson, dessen Form als charakteristisch für die Species gilt, war hier bei Männchen und Weibchen verschieden gestaltet, bei beiden zwar länglich, oben etwas verschmälert mit geraden Seitenrändern, aber bei jenen ganzrändig und abgerundet bei diesen hingegen länger und scharf und tief eingeschnitten, daher zweispitzig, jede Spitze mit einem Stachelchen besetzt." Though he had specimens with eggs well advanced in development, Grube states that he had sought in vain for the marsupial plates. On the whole I incline to infer that, while assuming to describe the female of *Lysianassa longicornis*, Lucas, he has had before him not only a distinct species, but the species of a distinct genus, probably *Ichnopus taurus*, A. Costa. He figures and describes (seemingly

from the female only), what he calls "gefiederte Kieme," the branchiæ not simple, but carrying symmetrically arranged supplementary vesicles, an arrangement now known to exist in several species, and already described by Costa in *Ichnopus*. He also draws discriminating characters from the mouth-organs of the three species *longicornis*, (probably the ? so-called), *spinicornis* and *ciliata*.

Grube makes *Leptocheirus*, Zaddach, and *Ptilocheirus*, Stimpson, synonyms of *Protomedeia*, Kroyer, in agreement with Spence Bate and other writers, but Boeck places *Leptocheirus*, with *Ptilocheirus* for a synonym, in his subfamily Leptocheirinæ, and *Protomedeia* in the subfamily Microdeutopinæ, the differences being in the maxillipeds, the side-plates, the second gnathopods, and the last uropods. In the Leptocheirinæ, moreover, it is noted that the first joint of the mandibular palp is elongate. Grube describes "*Protomedeia hirsutimana*, Sp. Bate? Taf. x. fig. 2," but in the description of "Taf. x. fig. 2," he calls it "*Protomedeia pilosa* (Zadd.)," having apparently convinced himself of the identity of his own specimen with Zaddach's species. His new species, *Protomedeia guttata*, Taf. x. fig. 3, as well as the old one, must evidently be placed in the genus *Leptocheirus*.

He figures his species *Crangonyx recurrus*, Taf. x. fig. 1, and describes it anew.

Being unacquainted with *Gammarus marinus*, Leach, Grube refers a species, which he had previously called *Gammarus olivii*, M.-Edw., to *Gammarus pœcilurus*, Rathke. He describes *Gammarus gracilis*, Rathke, recognising that it may be only a variety of *Gammarus pœcilurus*. All these *Gammari* are by Boeck accepted under the name *Gammarus marinus*, Leach. Grube concludes this paper with a description of *Gammarus locusta*, Linn.

1866. HELLER, CAMIL.

Beiträge zur näheren Kenntniss der Amphipoden des Adriatischen Meeres. Wien. 1866 in 4to. 62 pp. u. 4 Kpfr. Denkschriften der k. Akad. d. Wissensch. Mathem. naturw. Cl. B. 26. 2 Abth. pp. 1–62. (Vorgelegt in der Sitzung am 3 Nov. 1865).

Orchestia montagui, Audouin, is given as a distinct species from *Orchestia littorea*, Leach, but *Orchestia constricta*, Costa, is made synonymous with *Orchestia montagui*. The new species described and figured are *Nicea plumicornis; Nicea fasciculata; "Nicea Bucchichi;" Nicea nudicornis: Nicea macronyx*, which will be *Hyale prevostii*, if Catta is right in identifying it with *Amphithoe prevostii*, M.-Edw.; *Nicea camptonyx: "Nicea Schmidtii;" Nicea rudis: Nicea crassipes; Probolium megacheles*, which being without mandibular palp must be transferred to Dana's genus *Stenothoë*, and, for the species, is identified by Catta, 1876, with Costa's *Probolium polyprion; Lysianassa pilicornis: Ichnopus affinis; Ichnopus calceolatus*, identified by Boeck with his own *Ichnopus spinicornis*, 1860; "*Anonyx Schmardæ*," in Boeck's opinion, perhaps, together with the next species, belonging to his genus *Ambasia; Anonyx filicornis;* "*Anonyx Nardonis*" (at p. 59 by a misprint assigned to Kroyer), said to differ little from *Anonyx nanus*, and by Boeck referred to his genus *Tryphosa; Iphimedia carinata*, not figured, and not in my opinion specifically distinct from *Iphimedia obesa*, Rathke, which includes two other synonyms or varieties, *Iphimedia eblanæ*, Sp. Bate, and *Iphimedia multispinis*, Grube; *Eusirus bidens*, already described by Boeck as *Eusirus longipes;* "*Melita Coronii;*" *Mæra integrimana:* "*Mæra Donatoi*," which, like *Mæra grossimanus*, Montagu, and *Mæra Lovéni*, Bruzelius, has the finger of the second gnathopods fringed with hairs on the outer margin; *Amphithoë bicuspis*, a name preoccupied by Kröyer, and the species identical with *Sunamphithoë conformata*, Sp. Bate; from *Sunamphithoë hamulus* Heller himself observes that it is distinguished only by the greater

length of the upper antennæ and by the presence of two terminal hooks on the telson; "*Amphithoë Brusinæ*:" *Podocerus monodon*, identified by Boeck with *Podocerus falcatus*, Montagu; Heller himself distinguishes it from *Podocerus variegatus*, "especially by the presence of a simple hook on the outer branch of the third uropods," (compare *Amphithoides*, Kossmann, 1880); *Podocerus largimanus*, with forty joints to the flagellum of the upper antennæ, yet given by Boeck as a synonym of *Podocerus anguipes*, Kroyer, which has that flagellum of six to eight joints; *Podocerus longicornis*, said by Heller to approach *Amphithoë crassicornis*, Costa, and by J. V. Carus, 1885 (probably on Nebeski's authority) entered together with the preceding species in the genus *Amphithoë*, without special notice of the secondary flagellum in each of these species; "*Microdeutopus Titii*," *Cyrtophium lævæ*, probably the same as *Cyrtophium darwinii*, Sp. Bate, Dr. Heller having apparently taken the account of the transverse ridge to mean a longitudinal carina; *Cratippus crassimanus*, without much doubt to be united with *Cratippus tenuipes*, Sp. Bate, and *Erunguia stilipes*, Norman, under the common name *Colomastix pusilla*, Grube; *Caprella obtusa*, which Boeck identifies with *Caprella septentrionalis*, Kroyer, and Mayer with *Caprella acutifrons*, Latreille, ♂ juv.; *Caprella monacantha*, which again according to Boeck is *Caprella esmarkii*, Boeck, but according to Mayer, *Caprella æquilibra*, Say, ♂ juv.; *Caprella aspera* = *Caprella acanthifera*, Leach; *Caprella leptonyx* = *Caprella acanthifera* juv.; and *Caprella armata*, according to Mayer another synonym of *Caprella acanthifera*, Leach.

Costa's *Lysianassa filicornis* is said to be a synonym of *Lysianassa longicornis*, Lucas; *Lysianassa humilis*, Costa, possibly of *Lysianassa costæ*, Milne-Edwards, and *Lysianassa ciliata*, Grube, of *Lysianassa audouiniana*, Sp. Bate. Boeck regards Grube's *ciliata* and possibly Costa's *humilis* as belonging to his genus *Aristias*, of which he makes *Anonyx tumidus*, Kroyer, the type, with *Lysianassa audouiniana*, Sp. Bate, (wrongly given) as a synonym. *Amphithonotus spinirentris*, Costa, is renamed *Dexamine spinirentris*, *Amphithonotus*, Costa, being synonymous with Leach's genus *Dexamine*. Under the name of "*Atylus Costæ*" are united Costa's two species *Nototropis spinulicauda* and *Nototropis guttatus*, though surely *guttatus*, in right of priority, should have been retained. The close agreement between *Leucothoë articulosa*, Leach, and *Leucothoë denticulata*, Costa, is pointed out. Both these species are united by Boeck under the older name *Leucothoë spinicarpa*, Abildgaard. Three species described by Costa under the names *Gammarus punctimanus*, *Gammarus obtusmanus*, *Amphithoë semicarinata*, are all referred, the two former as males, the last as female, to *Gammarella brevicaudata*, Sp. Bate. *Ceradocus orchestiipes*, Costa, which Sp. Bate transferred to *Melita*, here becomes *Mæra orchestiipes*. It is in all probability the *Gammarus fasciatus* of O. G. Costa. Attention is called to points of agreement between *Mæra grossimana*, Leach, *Mæra scissimana*, Costa, and *Mæra integrimana*, Heller's own species. *Megamæra brevicaudata*, Sp. Bate, is transferred to the genus *Mæra*. A species supposed to be *Eurystheus erythrophthalmus*, Sp. Bate, but with cleft telson, receives the name *Mæra erythrophthalma*. Since, however, Spence Bate's species is the same as *Gammaropsis erythrophthalmus*, Liljeborg, Heller's species, with the cleft telson, must not be confounded with it. The similarity of *Amphithoë penicillata*, Costa, to *Amphithoë albomaculata*, Kröyer, is noticed. It is pretty certainly the same as *Amphithoë raillantii*, Lucas, 1849, if it may not be carried still further back to *Amphithoë rubricata*, Montagu. *Erichthonius hibernus*, Costa, is said to be identical with *Corophium abditus*, Templeton. *Corophium crassicorne*, Bruzelius, is identified with the earlier named *Corophium acherusicum*, Costa, an identification which Boeck accepts with a? *Caprella tabida*, Lucas, is made a synonym of *Caprella acutifrons*, Latreille.

A table is added of all the Amphipods found in the Adriatic up to the date of this work. Valuable descriptions and figures are given of several of the previously known species, as well as of the species discovered by Heller himself.

1866. Schiodte, J. C.

Krebsdyrenes Sugemund. Naturhistorisk Tidsskrift. 3. Raekke. 4. Bind. Kjobenhavn, 1866. pp. 169–206. Tab. X og XI.

This paper deals principally with the mouth-organs of the Isopoda. Of the biting Isopoda the mouth is said to present three principal types, and the first type is said to comprise *Onisci*, *Aselli*, *Idotheæ* and *Sphæromata*, and to be essentially the same as the type met with in the majority of the Amphipoda.

This paper is translated in "The Annals and Magazine of Natural History," ser. 4, vol. i. No. 1, January 1868, pp. 1–25. Plate 1.

1867. Bate, C. Spence.

Crustacea. The Record of Zoological Literature. 1866. Volume Third. London, MDCCCLXVII. pp. 216–250.

Spence Bate demurs to Grube's view that "*Allorchestes imbricatus* (Sp. B.), is but the young of *A. hilleri*." He "suggests to continental carcinologists to determine whether or not there be two freshwater species [of *Gammarus*], viz., *G. pulex* and *G. fluviatilis*, as, from the great confusion of the two names by various authors, he is inclined to think that they, and also the figures, are but the result of imperfect drawings and descriptions of one and the same species." *Gammarus torelli*, sp. n., Goës, he says, "evidently belongs to the genus *Megamœra* of the Brit. Sessile-eyed Crustacea." In the "Naturalist in Vancouver Island and British Columbia, by J. Keast Lord. London, 1866," vol. ii., ch. xiii., pp. 262–284, with a plate, a description is given by Spence Bate of the "Vancouver Island Crabs." In this chapter, he mentions from Esquimalt Harbour, *Allorchestes verticillatus*, Dana; *Allorchestes brevicornis*, Dana; *Mœra fusca*, Sp. Bate; *Amphithoë peregrina*, Dana; *Amphithoë orientalis*, Dana; *Amphithoë filicornis*, Dana.

1867 Costa, Achille.

Saggio della collezione de' Crostacei del Mediterraneo Del Museo Zoologico della Università di Napoli spedito alla Esposizione di Parigi del 1867. Annuario del Museo Zoologico della R. Università di Napoli. Anno IV., 1864. Napoli, 1867. pp. 38–46. Pl. III.

It mentions 72 species of Crustacea, the principal object being to show the specialities of the Italian waters, as discovered by Cocco, De Natale, O. G. Costa, Hope, and A. Costa himself. The numbers 32–59 refer to the Amphipoda. 35 is *Orchestia crassicornis*, n. s., near to *Orchestia littorea*, "but differing in the proportions and robustness of the lower antennæ, especially of the male. They are shorter and more robust than in the three allied species, *littorea*, *mediterranea*, and *constricta*." On 37, *Orchestia deshayesii*, Audouin, it is remarked that the hand of the second gnathopod varies greatly. 40, *Lysianassa filicornis*, A. Costa, "by the length and tenuity of the lower antennæ approaches *L. longicornis*, Lucas, from which it is distinguished chiefly by the proportions of the upper antennæ, those of the abdominal false feet and other characters. Nevertheless, the two species in question, on account of the extreme length of the lower antennæ, may very well constitute a distinct group or subgenus, for which we have proposed the

name of *Lysianassina*." On 45, *Epimeria tricristata*, A. Costa, the observation is made that it is very close to *Acanthonotus owenii*, Bate and Westwood, so that at first sight they might be thought the same, but that specifically they differ much in the length of the antennæ and the hands of the second gnathopods. Nor does Costa admit the propriety of placing the species in the genus *Acanthonotus*. Boeck, who has not apparently seen this paper, makes both names synonyms to *Epimeria cornigera*, Fabricius. As to 47, *Gammarus longicaudatus*, A. Costa, and 48, *Gammarus montanus*, A. Costa, it is recognised that these two fresh-water species, of which the first is identified by Bate and Westwood with *Niphargus aquilex*, Schiødte, may be only varieties of one and the same species. 49. *Guerinia nicæensis*, A. Costa, is figured. In regard to 51, *Microdeutopus gryllotalpa*, A. Costa, the form of the carpus of the first gnathopods is said not to be accurately given in the figure of the species by Bate and Westwood. As a matter of fact, their figure probably represents a different species. Costa further observes that the carpus of his species is found to vary in regard to the number and proportions of teeth on its lower margin. 59 is *Caprella gigas*, A. Costa, from the Bay of Naples, undescribed. 54 is *Orio zancleus*, Prest. 55, *Cheiropristis messanensis*, Cocco. 56, *Ornithorhamphus coccoi*, De Nat. 57, *Carcinococcus costæ*, De Nat. (not an Amphipod).

1867. GERSTAECKER, A.

Bericht über die wissenschaftlichen Leistungen im Gebiete der Entomologie während der Jahre 1865–66. Archiv für Naturgeschichte. Drei und dreissigster Jahrgang. Zweiter Band. Berlin, 1867.

The works on Amphipoda are described in pages 487–495.]

1867. MARCUSEN, JOH.

Zur Fauna des schwarzen Meeres. Vorläufige Mittheilung. Archiv für Naturgeschichte. Drei und dreissigster Jahrgang. Erster Band. Berlin, 1867. pp. 357–363. (Also in the Transactions of the first meeting of Russian Naturalists at St. Petersburg, 1868. pp. 176–179. In Russian.)

The list of the Amphipods which Dr. Marcusen had obtained is given as follows :—"Talitrus locusta Linn. Orchestia littorea Montagu. Orchestia mediterranea Costa. Montagua pontica mihi—ähnlich der M. marina Sp. B. Bathyporeia pontica mihi—ähnlich der B. Robertsonii Sp. Bate, mit calceola am unteren Fühler, aber auch einer calceola am oberen. Ampelina Gaimardii Sp. Bate. Dexamine pontica mihi—mit gefiedertem Kiemenplättchen. Calliope grandoculis. Microdentopus gryllotalpa Sp. Bate. *Microdentopus* nov. spec. *Microdentopus* nov. spec. Gammarus glacilis Rathke. Gammarus locusta Linn. pilosus var. mihi. Amphitoë picta Rathke. Podocerus pulchellus M.-Edw. Podocerus ähnlich dem falcatus Sp. Bate. Podocerus ähnlich dem pelagicus S. Bate, Cerapus ponticus mihi. *Siphonœcetes* n. sp. Corophium Bonellii M.-Edw. Corophium bidentatum mihi. Corophium ähnlich dem crassicorne." The description of the new species, with figures, is promised for a later opportunity. The question is discussed whether the Black Sea should be reckoned as part of the Mediterranean, a question which C. Heller answers in the affirmative. Of Amphipoda, it is said that there are in the Black Sea representatives of almost all families, among them species not as yet found in

the Mediterranean, as *Bathyporeia pontica;* there are several nest-builders, as species of *Podocerus*, *Cerapus* and *Siphonœcetes*. The resemblance of its Crustacean fauna to that of the northern seas is illustrated by the presence, among others, of species of *Bathyporeia*, *Podocerus* and *Siphonœcetes*.

1867. Norman, Alfred Merle.

Reports of Deep Sea Dredging on the Coasts of Northumberland and Durham, 1862–4. Edited by George S. Brady. Report on the Crustacea, by the Rev. Alfred Merle Norman, M.A. Natural History Transactions of Northumberland and Durham: 1865–67. London, 1867. pp. 12–29.

The new genus *Cheirocratus*, assigned to Fam. Gammaridæ, Norman. (Subfam. Gammarides B. & W.) is thus defined:—"Superior antennæ shorter than inferior, having a secondary appendage. First gnathopods not subchelate. Second gnathopods subchelate, very large. Telson double. Last pair of pereiopods very long." The type species, *Cheirocratus mantis*, here fully described as new, is identified by Boeck with *Gammarus assimilis*, Lilljeborg, 1851.

In the family Corophiidæ, Bate and Westwood, the genus *Unciola*, Say, is described as having the "last uropods double-branched," which is not in accordance with Say's own account. In the description of the new species, *Unciola planipes*, we also read, "uropods of last pair two-branched, small, scarcely reaching beyond telson, or the basal joint of preceding pair; outer branch tipped with long simple hairs; inner branch terminating in a single spine." The figure (G. S. Brady del.) gives only a single branch, and a prolongation of the peduncle tipped with a spine. Boeck gives the species as a synonym ? of his *Glauconome kröyeri*, 1870. The Museum Normanianum, 1886, gives "Unciola planipes, Norman, = Unciola leucopis, B. & W. (non Kröyer)."

1867. Norman, A. M.

Report of the Committee appointed for the purpose of exploring the coasts of the Hebrides by means of the dredge. Part II. On the crustacea, echinodermata, polyzoa, actinozoa, and hydrozoa. (From the Report of the British Association, for 1866.) pp. 193–206. 1867.

Eight Amphipods are added to the British Fauna. Among these are the new species *Anonyx melanophthalmus*, the new genus, *Euonyx*, "differing from *Anonyx* in having the first gnathopods chelate, and the second stronger than the first, subchelate, nail large and strong. Posterior uropods two-branched. Telson cleft," with its new species *Euonyx chelatus*, "dredged parasitic on *Echinus esculentus*, L."; and the new genus *Microprotopus*, "allied to *Microdeuteropus*," but with differences shown in the italicized part of the following definition:—"Antennæ with secondary appendage. First gnathopods subchelate. *Second gnathopods larger than first*, subchelate, greatly developed in ♂, much smaller in ♀. Uropods terminating in simple spines, *those of last pair with a single ramus*. Telson tubular." The new species for which this genus was formed is named *Microprotopus maculatus*.

1867. Packard, A. S., jr.

View of the recent Invertebrate Fauna of Labrador. Memoirs read before the Boston Society of Natural History; being a new series of the Boston Journal of Natural History. Volume I. Part. II. Boston, 1867. (Read October 4, 1865. pp. 262–303. Pl. VIII.

Packard's article on the marine invertebrates found at Caribou Island, Straits of Belle Isle, which was published in the Canadian Naturalist and Geologist for December 1863, is, he says, embodied in the present article, with typographical corrections. "Valuable information regarding the identification of several species of Amphipoda has been kindly communicated through Dr. Lütken by Mr. A. Boeck." The Amphipoda occupy pages 297–301.

"*Monoculodes nubitalus* nov. sp. [Pl. VIII., fig., 4.]," is thus described:— 'Female. Cephalic ring produced into an obtuse, tumid rostrum, smaller than in *M. carinatus* Bate, of the British shores; the segments of the thorax and abdomen are not carinated above as in that species, being nearly smooth, while the abdominal segments are slightly sinuated just behind each suture. Eyes small, round, situated just above and opposite the insertion of the superior antennæ; not colored in the adult, but black in the young. Superior antennæ a little longer than the peduncle of the inferior pair; inferior antennæ reaching to the hind edge of the fourth thoracic, including the cephalic, ring; the penultimate and last joint of the peduncle equal in length; flagellum about half the length of the whole antenna. Both pairs of gnathopoda very equal in size, the propodos being long, ovate; anterior pair slenderer than in *M. carinatus*, palm very oblique, with minute hairs; dactylos two thirds the length of the propodos; carpos minute, not prominently produced as in *M. carinatus*, but rather continuous with the propodos. The second pair are much stouter and more ovate than in *M. carinatus*, according in this respect more with that of *M. demissus*, Stimps. In form it closely repeats that of the anterior pair; carpus with a long, slender, spine-like prolongation from the palm, forming a thumb closely appressed to the propodos, but not extending to the middle. Palm of the propodos on the anterior half fringed with hairs. Dactylos one-half as long as the propodos. Anterior pair of thoracic legs subequal; posterior pair of thoracic legs twice as long and much larger than the anterior, coxæ regularly short, pyriform. Abdominal legs large, equal in size, reaching nearly to the tip of the candal stylets, which are lanceolate, very slender, acute; the first pair being a very little longer than the third. Color pale, mottled with slate. Length, ·50 inch.

"It differs from *M. demissus* of Grand Menan, in its color, and the very unequal antennæ. From *M. carinatus* of the British Isles it may be readily distinguished by the very equal gnathopoda and non-carinated segments, the slenderer antennæ, and the smaller, round eyes.

"Caribou Island, eight fathoms, sand." See also Note on S. I. Smith, 1883.

1867. Sars, Georg Ossian.

Histoire Naturelle des Crustacés d'eau douce de Norvège. 1e livraison. Les Malacostracés. Avec 10 Planches. Christiania. 1867. pp. III+146. (Amphipoda, pp. 41–90. Pl. IV., V., VI., VII., VIII. fig. 1–5.)

In this masterpiece Professor Sars has taken the opportunity to describe, with great fulness of detail and a clearness that leaves nothing to be desired, the whole structure of an Amphipod, illustrating the description by figures which are not only elaborate and artistic but possess the further virtues of being in the most satisfactory manner explanatory and intelligible. In the period of active investigation since this work was published, one or two of its statements

have been called in question. In a note to p. 41 Professor Sars says that in some males of the genus *Tanais* the eyes are not only pedunculate (pédicellés) but even mobile. This statement, to say the least, requires confirmation. In regard to the apparatus for the circulation of the blood, Delage observes that, while Sars is the first who clearly pointed out the existence of a posterior aorta with definite walls, he reproduces the old mistake of attributing to the heart six, instead of three, pairs of lateral slits (valvules); nor does he recognise the delicate walls which more or less confine the currents of the blood. In regard to the species *Gammarus neglectus*, which Sars describes with so much valuable detail, Fr. Meinert inclines to believe that it should not be separated from *Gammarus pulex*, auctorum, the differences being at best minute, and these capable of being bridged over by intermediate examples. If the species stands, Meinert thinks it should retain the name *Gammarus lacustris*, which Sars gave it in 1863. For altering this Sars gives the insufficient reason that he had met with a casual reference in Nilsson's "Skandinavisk Fauna," tome 4, page 420, to a species named in parenthesis "(Gammarus neglectus Lilljeborg)," on which the trout, var. *Salmo punctatus*, fatten in the Scandinavian mountain-tarns. It is certainly an error to suppose, as Sars appears to do on the authority of Hosius, that *Gammarus pulex* is only found in very rapid rivers.

On page 59, under the heading *Organes excréteurs*, Sars observes "Comme organes excréteurs et avant tout urinaires, correspondant aux vaisseaux de Malpighi des insectes, on doit indubitablement considérer les 2 minces appendices cylindriques (pl. 5, fig. 25 p.), qui débouchent en haut dans l'intestin à la naissance du rectum. Placés l'un tout contre l'autre et contre la face dorsale de l'intestin, ces appendices pénétrent profondément, chez les individus adultes, avec leurs bouts obtusément arrondis dans le dernier segment thoracique. . . . . On doit sans doute encore faire entrer dans cette catégorie un canal flexueux en forme de fronde, de structure glanduleuse, qui se trouve dans le premier article fortement tuméfié des antennes inférieures et débouche sur la pointe du procès conique que le 2e article envoie en bas, la soi-disant épine olfactoire." The reader therefore must not be led astray by the references to the "olfactory spines" on page 48, and in the descriptions of pl. iv. fig. 21 and pl. vi. fig. 27. A further safeguard is supplied on page 62, where Professor Sars says, "Le sens *olfactif* ou le sens qui chez les crustacés semble s'en rapprocher le plus, est, comme chez le genre Mysis, restreint à la tigelle extérieure des antennes supérieures; chacune de ses articulations porte généralement au bout, dans le bord supérieur, un appendice cylindrique très petit, correspondant exactement dans sa structure aux papilles appelées olfactoires des décapodes." As to the analogy of the urinary organs first mentioned with the Malpighian tubes of insects, see Note on Spencer, 1885.

Of the pleopods Sars figures and describes the peculiar spines and special setæ (à bout bifurqué), which have either escaped the notice of authors in general or not been thought worthy of attention.

The other Amphipods described in this work are *Pallasea cancelloides*, Gerstfeldt, var. *quadrispinosa*, Esmark; *Gammaracanthus loricatus*, Sabine, var. *lacustris; Pontoporeia affinis*, Lindström, said to come very close to *Pontoporeia femorata*, Krøyer.

1868. BATE and WESTWOOD.

A history of the British Sessile-eyed Crustacea, Part XXII. and Part XXIII. December 31, 1868. pp. 497–536, and Introduction, signed (C. S. B.), pp. iii.–lvi. London.

The gnathopods of *Orchestia brevidigitata*, n. s., from Banff are figured and described. The length is given as about eight-twentieths of an inch, the colour a light olive-green. It is

said to bear a close resemblance to *Orchestia cuchore*, Müller. As Boeck identifies the latter with *Orchestia gammarellus*, this species also may be a variety of the same.

A short account is given, and the second gnathopod figured, of Kroyer's *Leucothoë clypeata*, under the name *Montagua clypeata*, with the suggestion that *Montagua pollexiana*, Spence Bate, may be the male of Kroyer's species; in that case it would become a synonym of *Metopa clypeata*, Kroyer. The second gnathopod of *Montagua norvegica* is figured and described, with a reference to *Leucothoë norvegica*, Liljeborg, 1850, and to the Brit. Mus. Catal., p. 370, where Spence Bate expresses the opinion that this species is most probably a synonym of *Montagua clypeata*. Boeck agrees with this view, naming it therefore *Metopa clypeata*, Kroyer (but see Note on Liljeborg, 1850).

At page 501, *Opis leptochela*, n. s., is figured and described. Of this Norman, Last Report, etc., p. 335, 1868, says, "this I find to be the species described by me under the name *Euonyx chelatus* (Brit. Assoc. Report 1866 (1867), p. 202). My specimen differs from that described by B. and W. in having the second gnathopods larger and stronger than the first, and the hand furnished with a strong nail. This difference is perhaps one of sex. The species cannot, I think, be placed in the genus *Opis*." Boeck, apparently unaware of Norman's genus, says of *Opis leptochela*, that it cannot belong to *Opis*, "as the first gnathopod has a very elongate wrist and an elongate chelate hand, thereby resembling the genus *Krögeria*, which belongs to the subfamily Œdicerinæ. It ought therefore to become the type of a new genus, which might be called *Leptochela*."

At page 503, *Opis quadrimana*, n. s., is described, and the first gnathopod figured. On the ground that this does not agree with *Opis* either in the mouth-organs or the structure of the first gnathopods, Boeck, in 1870, makes it the type of a new genus, under the name *Normania quadrimana*, Bate and Westwood.

A species is partly figured and described as probably belonging to *Ampelisca lævigata*, Lilljeborg, but by Norman and Boeck the form in question is said to be *Ampelisca tenuicornis*, Lilljeborg. *Haploops tubicola*, Lilljeborg, is figured and described, and said to have been taken by Mr. Norman "in the Shetlands," where "Hebrides" should be read instead of "Shetlands."

At page 507, *Monoculodes longimanus*, n. s., from Banff, "length about one-fifth of an inch," is briefly described, and the first and second gnathopods are figured. "*Specific character.* Dorsal surface slightly carinated. First pair of gnathopoda long and narrow, resembling the second pair."

At page 508, *Kroyera brevicarpa*, n. s., is described. The gnathopods are figured. This is identified by Boeck with *Krögeria haplocheles*, Grube, 1864, and therefore named *Pontocrates haplocheles*.

At page 509 the new genus *Lepidepecreum* is defined as follows:—"Cephalon having the orbital or intra-antennal process considerably developed and produced. Pereion well-developed. Pleon having the last four segments very short. Eyes not made out; supposed to occupy the intra-antennal process;—superior antennæ having the upper surface of the first two joints of the peduncle considerably produced anteriorly, having no secondary appendage. Inferior antennæ posterior to the superior. Mandibles furnished with a biarticulate appendage. First pair of gnathopoda moderately robust, subchelate. Second pair feeble and chelate or subchelate. Posterior pair of pleopoda short, biramous. Telson——?" The type is figured and described as *Lepidepecreum carinatum*, n. s. It was "taken at Banff by Mr. Edward, associated with *Anonyx longicornis*, with which it is very closely allied, being perhaps a young female." There seems little, I think, to justify the establishment of a new species, and the name for the two forms should therefore stand as *Lepidepecreum longicorne*. In the description of *Anonyx longicornis*, the telson was given as "very long and deeply cleft," so that "telson cleft" may be presumed to be properly part of the generic

character. G. O. Sars, 1882, mentions the capture at Lodshavn of a single specimen (♀) of "*Lepidepereum carinatum*, Sp. Bate," but does not describe the telson. In a specimen which I owe to the kindness of Mr. David Robertson of Glasgow, I find the telson very narrow, cleft almost to the base, each tip having two small spines. Sars thinks that *Lysianassa umbo* of Goës should be included in this genus, and not in Boeck's *Orchomene*. See Note on Goës, 1865.

Nicippe tumida, Bruzelius, is figured and described.

Cheirocratus mantis, Norman, is figured and described, but with some variations in the *generic character*, which need correction. The upper antennæ are much shorter than the lower, not subequal, and the third uropods are not unibranched, but biramous. The species is identified by Boeck with the earlier *Cheirocratus assimilis*, Liljeborg.

At page 515, *Megamœra multidentata* (Norman, MSS.), from Guernsey, is figured and described. This is "Mœra Batei," Norman, published in the Annals and Magazine of Natural History for December 1868, and therefore taking precedence by a few days of the name *Megamœra multidentata*. This is indicated at page 530 by the citation, "Mœra Batei Norm. (See our Vol. ii. p. 515)," but no notice is there taken of some slight discrepancies between the two accounts, which were no doubt drawn up from different specimens.

On pages 517–518, Norman's *Unciola planipes* is figured and described as *Unciola leucopes*, Krøyer, Krøyer's genus *Glauconome* being identified with *Unciola*, Say. Norman, Last Report, etc. 1868, says, "*Unciola leucopes*, Kröyer. B. and W. consider my *U. planipes* as 'probably identical' with this species. It may be so, but there are points of difference which make me think it wiser to keep them apart until the examination of Greenland specimens should settle the question definitely." Krøyer's species, it should be observed, was named *leucopis* from "λευκος, albus, et οψ, oculus." Boeck gives "*? Unciola planipes*, Norman," as a synonym to his own *Glauconome kröyeri*, 1870. Sars in 1882 accepts *Glauconome leucopis*. Krøyer, as identical with *Unciola irrorata*, Say.

Hyperia tauriformis, n. s., from Banff, briefly described and partly figured on page 519, is identified by Norman with *Metoecus medusarum*, Krøyer, which Boeck names *Tauria medusarum*, O. Fabr., 1780, but Bovallius, 1885, points out that Bate and Westwood, and Boeck likewise, have misunderstood Dana's account of his genus *Tauria*, so that neither the name *Hyperia tauriformis* nor *Tauria medusarum* is admissible. The name will perhaps become *Hyperia abyssorum*, Boeck.

On page 520, *Hyperia prehensilis*, n. s., from Banff, is figured and described. "*Specific character.* Superior antennæ about the length of the head. Both pairs of gnathopoda with the carpus and propodos simple. Three hind pairs of pereiopeda subprehensile at the tips." Length, three-twentieths of an inch.

On page 521, *Hyperia cyaneæ*, Sabine, is described. "It looks like a young *H. Galba*, with rudimentary antennæ, but one of the specimens sent to us had the incubatory pouch of the adult female fully developed, so that we cannot mistake it for a young animal." By Boeck Sabine's species is identified with *Hyperia medusarum*, O. F. Müller.

Themisto crassicornis, Krøyer, is next figured and described, a species which Boeck identifies as *Themisto libellula*, Mandt.

On pages 534–535, *Vibilia borealis*, n. s., from Banff, is figured and described, a letter from Thomas Edward, on its habits and colouring, being quoted.

In the Supplemental Notes, among other matters of interest, the names are mentioned of the genera and species of which A. M. Norman had published descriptions in December 1868.

The Introduction, signed C. S. B., is a general account of the structure, functions and distribution of the Amphipoda.

1868. Brady, George Stewardson, born April 18, 1832 (G. S. B.).

Notes on the Crustacean Fauna of the English Lakes. Intellectual Observer, XII. 1868. pp. 110–130, with plate.

"*Gammarus* and *Asellus* are scarcely to be found in" the British lakes, according to this observer; "marine forms of Amphipoda, analogous to those of the large lakes of Sweden, have not been found." (Zool. Record, 1869.)

1868. Czerniavski (or Tschernjafski), Woldemar.

Materialia ad Zoographiam Ponticam comparatam. Studiosi universitatis charcoviensis Voldemari Czerniavski.

At page 78 is given "Ordo VI. Arthrostraca Cls. s. Edriophthalmata. Subordo. a. Isopoda." At page 90, "Subordo. b. Læmodipoda," contains Fam. 24. Caprellidæ. Gen. 41. *Protella*, Dana. 51. *Protella typica*, n. s., (juv.?), Tab. vi. fig. 7–10; 52. *Protella intermedia*, n. s., Tab. vi. fig. 11–13. Gen. 42. *Caprella*, Lamarck. 53. *Caprella protelloides*, n. s., Tab. vi. fig. 14; 54. *Caprella ferox*, Tab. vi. fig. 15–20; 55. "*Caprella Danilevskii*," n. s., Tab. vi. fig. 21–34. Of these, the two species of *Protella*, both less than 4 mm. in length, are considered by Mayer to be certainly young, possibly female, forms, with nothing to show whether they belong to *Protella* or *Caprella*. *Caprella protelloides* is in much the same indefinite situation. *Caprella danilevskii* he considers to be either identical with or extremely like *Caprella inermis*, Haswell, but he leaves the names undisturbed, while he makes *Caprella ferox* definitely a synonym of *Caprella acanthifera*, Leach. From a comparison of specimens brought by the Challenger from the Bermudas with a specimen of *Caprella inermis* sent me by Mr. Haswell from Australia, and a further comparison of these specimens with Czerniavski's figures, it becomes, I think, quite clear that we have in *Caprella danilevskii* to deal with a species of very wide range, and that the name *danilevskii* must take precedence of *inermis*, which is moreover preoccupied.

At page 93, "Subordo. c. Amphipoda. Divisio. Gammarina, Kröyer. Subdivisio. I. Domicola," contains Fam. 25. Cheluridæ Allman. "Gen. 43. *Chelura* (Philippi), emend." To this is assigned *Chelura pontica*, n. s., Tab. vii. fig. 1–18. But the figures and long description do not seem to distinguish it from *Chelura terebrans*, Philippi.

"Fam. 26. Corophiidæ Sp. Bate and W.," contains "a. Subfam. Corophiides Sp. Bate and W. Gen. 44. *Corophium* Latr.;" "57. *Corophium Bonellii* Edw.," on which he says, "Additio. Articuli pedunculi *antennarum inferiorum* 3-ius et 4-tus margine interiore spinis fortibus insiti, art. 5-tus spinis duabus armatus et unguibus duobus terminatus;" "b. Subfam. Podocerides Sp. Bate and W.;" Gen. 45. *Dercothoe* (*Cerapus* ♀) Dana; 58. *Dercothoe* (*Cerapus* ♀) *punctatus*, Edw.; Gen. 46. *Cerapus*, Say, with *Erichtonius*, Edwards and Bruzelius, *Cerapodina*, Edwards, *Podocerus* (pars) Kröyer, and *Pyctilus*, Dana, as synonyms; 59. *Cerapus macrodactylus* (Dana), with *Pyctilus macrodactylus*, Dana, for a synonym, followed by a quotation of the description, and "*Varietas pontica* mihi," thus described:—

"Mas. *Antennæ inferiores* articulo 3-io breviore quam 4-to, flagello multo breviore quam basis, sed multo longiore quam art. 4-tus. Manus 2-da fere parallelogramo-forma, digito immobili basi incrassato, manu ultra hujus digiti [basin] abbreviate-producta, digito paulo longiore quam manus, articulo ejus 1-mo paulo longiore, incrassato, 2-do curvo, paulatim attenuato, apice obtuso setis obsito. Articulo *5-ti paris* 2-do (art. 1-mus Dana) postice obtuso. Additio. *Oculi* rubri. *Antennæ inferiores* flagello 7-articulato. Articulus 2-dus *pedum*

3-ii–7-mi paris latus. Long. corp. usque ad 5 mm. Colore griseo cum maculis parvis nigris. Femina feminæ *C. difformi* similis."

60. *Cerapus pugnax* (Dana), is followed by a quotation of the description, and "*Var. Pontica* m. *Antennæ superiores* flagello longitudine variabili, plus minusve breviore quam pedunculum. *Pedes 2-di paris* digito minus elongato, articulo ejus 1-mo crasso, 2-do margine posteriore incrassato, apice obtuso setis nonnullis obsito. *Oculi* rubri. Long. corp. usque ad 3·8 mm. Color ut in præcedente." The quotations which I have omitted in regard to this and the preceding species are given in V. Carus, prodr. Faun. Medit., p. 393, but Czerniavski's own descriptions of his varieties are omitted by Carus.

"61. *Cerapus bidens*, nov. sp. *Varietati ponticæ Cerapi macrodactyli* simillimus, nisi *pedes paris 2-di* digito immobili paulo curvato et in apice bidentato, articulo 5-to intus maxime erroso, tuberculo subbasali valde forti. Long. corp. usque ad 5·2 mm." These differences, from a species confessedly variable, are but of doubtful specific value. The species is not noticed by Victor Carus, Faun. Medit., except in so far as he intimates that the name is preoccupied, by giving "*C. bidens*, V. Crs. (nec Czern.)," to take the place of Costa's *Erichthonius bidens*.

Gen. 47. *Podocerus*, Leach, is given with the synonyms, *Ischyrocerus*, Kröyer, *Cerapus* (pars), Milne-Edwards, *Jassa* Leach, Milne-Edwards, *Gammarus* (pars), Rathke, *Cratophium*, Dana. "62. *Podocerus Ocius*, Sp. Bate;" 63. *Podocerus dentex*, n. s., Tab. vi. fig. 35, is thus described:—"Mas. Frons obtusa. *Antennæ superiores* inferioribus paulo breviores et multo debiliores, flagello 3-articulato, articulo præcedente non multo longiore, articulis valde decrescentibus, filis olfactoriis tenuioribus in margine inferiore instructo, flagello secundario rudimentario; *a. inferiores* incrassatæ, flagello 3-articulato, articulis valde decrescentibus, sub apice spinis unguiformibus duabus armato. Ambo paria antennarum margine inferiore sat setoso. *Pedes paris 1-mi* manu pyriformi, triplum majore quam carpo, palma setulosa et spinulis nonnullis (3) subbasalibus armata, ungue forti, curvato, margine posteriore paulo dentato; *p. 2-di* manu magna, elongata, palma excavata, dentibus duobus posterioribus magnis et duobus vel tribus subapicalibus multo minoribus terminata setis plumosis dense obsita, ungue curvato, margine posteriore incrassato; *p. 3-ii* et *4-ti* breviores ungue minore, vix curvato. Long. corp. usque ad 4·3 mm. Color flavescente-brunescens, maculis nigris. *Oculi* nigri."

"Gen. 48. *Sunamphithoë* (Sp. Bate), emend.," is thus defined:—

"Ut *Amphithoë*. *Telson* crassum et vel uno hamulo vel duobus terminatum. *Pedes paris* 5-ti, 6-ti, 7-mi tarso (articulus 6-tus Sp. Bate) ad apicem dilatato." In the synonymy Czerniavski refers to *Amphithoë podoceroides*, Rathke, and *Amphithoë bicuspis*, Heller. He also assigns to this genus, "64. *Sunamphithoë valida* nov. sp., Tab. vi. fig. 36.," thus described:—"Mas. *Oculi* ovales. *Antennæ superiores* segmentum 6-tum thoracis attingentes, inferioribus paulo longiores, pedunculo apice articulum 3-ium inferiorum æquante, flagello filiformi duplo longiore quam pedunculus, 12–15 articulato (articulis in apice filo olfactorio instructis); *a. inferiores* validiores, pedunculo longissimo (flagello superiorum æquali), flagello brevissimo, fere triplum breviore quam pedunculus (3/4 articuli 4-ti æquante), articulis 7–9 valde decrescentibus. Ambo paria antennarum setulis paucis perbrevibus instructa. *Pedes paris 1-mi* et *2-di* maxime inæquales, *p. 1-mi* carpo sat magno, triangulari, manu subpyriformi, palma obliqua, denticulo spiniformi postice terminata, ungue in margine posteriore leviter dentato; *p. 2-di* manu valida semi-ovali, palma transversa, concava, postice dentem (fere indicem) validum, rotundatum exhibente, ungue maxime curvo, postice dentato. *Pedes ceteri* ut in *S. hamulo* Sp. Bate conformati, *p. 7-mi* tarso ad apicem maxime dilatato. *Telson* crassum, retrorsum paulo angustatum, marginibus lateralibus rectis, hamulis duobus fortibus terminatis. Flavescens, cum maculis nonnullis parvis fuscis. Femina. *Pedes paris 2-di* 1-mo non majores,

manu simili, nisi abbreviata et dilatata, carpo multo minore postice in processum elongatum, obtusum egresso. *Laminæ foliaceæ* ellipticæ, margine longe-cirrato. *Ova* ovalia, flavescentia, long. 0·36 mm. Long. corp. ♂ usque 6·3 mm., ♀ usque 6½ mm." The fig. 36, referring to the ♀ of this species, only represents "corpuscula setigesta sensitiva," not therefore greatly contributing to the understanding of the species itself.

"Gen. 49. *Amphithoë* Leach. 65. *Amphithoë Vaillantii* Lucas." In the synonymy to this species he gives, "(An *Cymadusa* Sav. = Amphithoe *filosa* Aud.?)," and then describes "*Varietas pontica* mihi. Tab. vii. fig. 19–27. Mas. *Antennæ superiores* inferioribus longiores, reversæ usque ad abdomen pertinentes, pedunculo articulum 3-ium inferiorum non superante, dimidium flagelli æquante, articulo 1-mo incrassato, breviore quam caput, vix longiore quam 2-do, 3-io trientem 1-mi æquante, flagello filiformi, articulis circ. 30, in apice filo olfactorio munitis. *Antennæ inferiores* incrassatæ, setosæ, pedunculo longo, articulo 1-mo (brevissimo) et 2-do junctis 3-io brevioribus, 4-to longiore, flagello brevi, non multo longiore quam articulus præcedens, articulis 18 (apicalibus exceptis) brevibus. *Oculi* parvi, rotundati. *Pedes paris 1-mi* et *2-di* longissimi, fortiores, unguibus fortibus, in margine posteriore denticulatis, *p. 1-mi* paulo minores, articulis 2-do et 3-io (art. 1-mus et 2-dus Luc.) in apice antrorsum spatuliforme fortissime productis, carpo et manu maxime elongatis, carpo in margine posteriore piloso, margine inferiore recte truncato, manu longiore et fortiore, pilosa, palma brevissima, leviter excavata, *p. 2-di* articulo 2-do (art. 1-mus Luc.) angustiore quam in primis, in apice late spatuliforme fortissime producto, carpo elongato, triangulari, manu maxime elongata, dilatata, in apice antrorsum maxime producta et rotundata, palma breviore, profunde excavata, postice dente forti obtuso terminata. *Pedes paris 3-ii, 4-ti* et *5-ti* breves, *p. 6-ti* et *7-mi* valde elongati, sed anterioribus breviores. *Pedes spurii p. postremi* ramis brevissimis, externo hamulis duobus fortibus armato. *Telson* triangulare, angulis obtusatis. Corpus sordide-flavescens, maculis fuscis aggregatis. Long. corp. 9·46 mm. Femina. *Pedes paris 1-mi* articulo 3-io in apice haud producto, carpo abbreviato, margine inferiore curvo, palma haud convexa, *p. 2-di* carpo haud elongato, latiore, postice in processum rotundatum producto, manu haud elongata nec in apice producta. Long. corp. usque ad 8·73 mm.

Gen. 50. *Grubia*, nov. gen., is thus defined :—

"*Antennæ superiores* filiformes, pedunculo longo, tribus articulis, 1-mo incrassato, 2-do et 3-io maxime attenuatis, paulisper in flagellum longissimum multiarticulatum exeuntibus, flagello secundario uniarticulato, rudimentario ; *a. inferiores* iis breviores, sed pedunculo longissimo, articulis 4 composito. *Pedes paris 1-mi* et *2-di* subchelati, 2-di multo majores, fortissimi. *Pedes spurii paris postremi* biramei, sed ramis ambobus minutissimis, rudimentariis, antecedentibus paris 2-di æquales, *paris 1-mi* paulo prominentes. Segmenta 11-mum et 12-mum spinis binis subter armata, 13-mum inerme. *Telson* squamiforme integrum." This contains one species, "66. *Grubia taurica* nov. sp., Tab. viii. fig. 1–10 [11]. *Antennæ* pilis tenuibus sparsis instructæ, *superiores* reversæ usque ad segmentum 7-mum vel multo longius pertinentes, articulis 29 ad 45, pedunculo dupla fere capitis longitudine et quarta flagelli principalis, articulo 1-mo vix breviore quam caput et vix longiore quam 2-do, 3-io trienti 2-di æquale, flagello principali filis olfact. tenuioribus instructo, flagello secundario uniarticulato, minutissimo ; *a. inferiores* $\frac{2}{3}$ superiorum æquales, articulis 29 ad 31, 1-mo (breviore) et 2-do junctis 3-io pæne æquantibus, 4-to vix longiore quam 3io, $\frac{3}{4}$ suæ longitudinis pedunculum superiorum superante. *Oculi* suborbiculares, rubri. *Pedes* pilis sat longis, tenuibus instructi ; *p. paris 1-mi* carpo elongato postice in processum obtusum piligerum exeunte, manu subovali, æque longa et lata ac carpo, palma pilosa, ungue forti curvato, margine posteriore mollissime dentato. *Pedes 3-ii, 4-ti* et *5-ti* validi, articulo 2-do maxime dilatato, 4-to et 5-to dilatatis, ungue curvo, *paris 5-ti* multo

minores, ungue parvo, minus curvato, *p. 6-ti* et *7-mi* multo longiores, longitudine 2-di paris, articulo 2-do dilatato, 6-to (tarsus) tenui et multo longiore quam in antecedente, ungue tenui curvo. *Pedes spurii* paris 1-mi et 2-di fortes, spinulis multis armati, pedunculo maxime dilatato, ramis longis, *paris 1-mi* multo majores, spina magna inter ramos posita, *paris postremi* pedunculo maxime incrassato, margine apicis externo-inferiore piloso, ramis brevissimis—ramo interno vix longiore—in apice spinulis et pilis parvis armatis. *Telson* basi lata, fere recta, lateribus maxime convexis in apicem obtusum convenientibus, dorsaliter postice carina lævi in denticulum parvum antrorsum producta, subtus fasciculum minutum spinarum gereus. Color lucide-brunneus vel subgriseo-flavus. Mas. *Pedes paris 2-di* 1-mo majores, fortissimi, carpo brevi triangulari, manu valida oblonga, pæne alterum tantum longiore quam lata, margine anteriore convexa, ungue fortissimo curvo, $\frac{1}{2}$ articuli proximi æquante. Femina. *Pedes paris 2-di* 1-mo simillimi. *Laminæ fotoriæ* longæ, ad apicem paulo latiores, cirris longis mollibus deuse marginatæ. *Ova* ovalia, flavescentia, long. 0,54 mm. Long. ♂ usque ad 12 mm., ♀ 8,7 mm."

"Subdivisio. II. Vagantia Sp. Bate and W. Tribus. A. Natatoria Sp. Bate and W. Fam. 27. Gammaridæ Sp. Bate and W.," contains "Subfam. *a.* Gammarides Sp. Bate and W. Gen. 51. *Gammarus*, Fabr." 67. *Gammarus pœcilurus*, Rathke, Tab. vii. fig. 28–36, with *Gammarus gracilis*, Rathke, and "*Gammarus Kröyeri*," Rathke, for synonyms, followed by a description and this "Additio," "Nonnulla exemplarium sinus Tahanrohensis aberrantia: alia de, *pedes spurii paris postremi* spinis tantum armati, setis destituti (characteres essentiales *Gammari Kröyeri* Rathke), alia de, *p. spurii paris postremi* ramo majore setis plumatis densis ornato, spinis tantum duabus lateralibus et spina magna apicali nulla; præter ea, nonnulli ♂ ♂ aberrantes de, *antennæ inferiores* pilis longis crispis densissimis, permultis pedibus 1-mi—4-ti paris, ornatæ." By Boeck Rathke's three species here mentioned are regarded as synonyms of *Gammarus marinus*, Leach.

Gen. 52. *Melita*, Leach. 68. *Melita palmata* (Montagu) Leach, with "*Gammarus Dugesii* (= ♀). M.-Edwards," among the synonyms, followed by a long description.

Gen. 53. *Niphargus*, Schiödte. 69. *Niphargus ponticus*, n. s., Tab. viii. fig. 12–14. "Caput segmentis tribus insequentibus junctis paulo brevius. Segmentorum abdominalium quodque in dorso postice setulam spiniformem gerens. *Antennæ superiores* abbreviatæ, reversa segmentum 4-tum attingentes, paulo setosæ, pedunculo paulo breviore quam caput, articulo 1-mo oblongo, crasso, 2-do dimidium 1-mi vix excedente, paulo longiore quam 3-io, flagello 4-articulato, longitudine pedunculum æquante, articulis longis, decrescentibus, flagello secundario bi-articulato, æque longo ac art. 3-ius. pedunculi. *Antennæ inferiores* pedunculo haud incrassato, articulo 1-mo (brevissimo) et 2-do (paulo longiore) junctis 3-io brevioribus, 3-io elongato, longiore quam art. 2-dus superiorum, 4-to . . . . . *Oculi* subovales, sat magni. *Pedes paris 1-mi* et *2-di* carpo elongato, subtus dilatato, latiore et longiore quam manus, manu quadrangulare-elongata angulis rotundatis, palma transversa, convexa, postice setulis spiniformibus armata, ungue curvato acuto, in basi dilatato et in margine posteriore setulas 3 emittente, *p. 3-ii* et *4-ti* articulo 2-do lato, 4-to antrorsum dilatato subtus latiore, 5-to paulo dilatato, ungue brevi basi incrassato, vix curvato; *p. posteriores* 3 validiores, spinis nonnullis armati, articulo 2-do latissimo subtus angustato, ungue majore. *Pedes spurii paris postremi* pedunculo crasso, ramo interiore minutissime-tuberculiformi, vix distincto, exteriore magno, crasso, longe-conico, segmentis tribus posticis junctis longiore, articulo 1-mo fere duplo longiore quam pedunculus et in apice spinis 3-4 armato, 2-do dimidium fere primi æquante, in apice bisetoso; *p. parium antecedentium* fere æque (usque ad basin ramorum ultimi) prominentes. *Telson* lateraliter oblongum attenuatum pedunculo pedis postremi longius, apice bi-spinuloso. *Color* brunnescens. 1 exempl. long. corp. 2,1 mm.; ant. sup. 0,73 mm.; pes caudalis 0,31 mm."

Gen. 54. *Pherusa*, Leach, with *Amphithoë* (pars), M.-Edwards (*nec* Dana); *Pherusa*, Sp. Bate

and Westwood, Grube, Heller; and *Paramphithoë* (pars), Bruzelius, in the synonymy, receives

70. *Pherusa pontica*, n. s. Tab. viii. fig. 15, thus described:—

"*Atylo bispinoso* Sp. B. permulto similis.

"Caput rostro acutissimo, leviter curvato, $\frac{2}{3}$ articuli 1-mi antennæ sup. æquante. Segmenta abdominis 1-mum et 2-dum dorso (cujusque) in dentem posticum acutissimum excurrente, segmenta tria anteriora angulis infero-posterioribus retrorsum acute productis, 3-ium margine posteriore in lateribus excavato, infra 3-dentato supra unidentato. *Antennæ superiores* inferioribus longissimis multo breviores, reversæ segmentum 5-tum attingentes, pedunculo breviore quam caput, articulo 1-mo incrassato ambobus ceteris junctis longitudine, flagello filiformi, articulis 17 elongatis, paribus vel imparibus, quoque in apice paulo latiore et filo olfactorio setulisque minutissimis instructo, ceteris lævibus. *A. inferiores* reversæ abdomen attingentes, superioribus duplo longiores, pedunculo incrassato, duplo longiore quam pedunculus superiorum, articulis 1-mo et 2-do brevibus, junctis 3-io æquantibus, 3-io et 4-to æque oblongis, flagello articulis 37–40, primo elongato, ceteris initio brevibus ad apicem crescentibus. *Oculi* magni, ovales. *Pedes paris 1-mi* et *2-di* mediocres, similes, carpo elongate-triangulari, sed multo breviore quam manus, *p. 1-mi* vix fortiores quam 2-di. *Pedes ceteri* fortes, crescentes, ungue magno forti curvo, *p. ultimorum* 3 spinosi, articulo 2-do ovali, postice serrato et infra rotundate-producto. *Pedes spurii* similes, ramis styliformibus spinulosis, in apice ungue vix curvato instructis, *p. 1-mi* et *2-di* pedunculo gracili, ramo exteriore breviore, 1-mi 2-dum prominentes, usque ad basin ramorum ultimi pertinentes, *p. postremi* (*3-ii*) pedunculo segmentorum 12-mi et 13-mi junctorum longitudine, incrassato ramis fere æque longis, pedunculo longioribus, præter spinulis setisque plumatis ornatis. *Telson* e latere visum acute acuminatum, supero visum ovato-lanceolatum, acuminatum.

"Mas. *Pedes paris 1-mi* et *2-di* manu carpoque sat fortibus, multo latioribus quam articuli ceteri, manu sæpissime elongate-pyriformi ad apicem angustiore, palma obliqua, convexa, spinulis debilibus dense obsita, ungue longiore quam palma, paulo curvato, debili; rarissime manus (adulti) forma ut in femina.

"Femina. *Pedes paris 1-mi* et *2-di* manu carpoque minoribus, nec latioribus quam articuli ceteri, manu subquadrangula longiore quam lata, in medio marginis anterioris fasciculo setularum ornata, palma oblique-convexa, tenuiter spinulosa, ungue in margine posteriore setulis nonnullis tenuioribus ornato. *Sæculus oriferus* [oviger] maximus; *laminæ fotoriæ* permaximæ, elongate-ovales, epimeras permulto excedentes, margine longe-cirratæ.

"Junior. Dentibus centrodorsalibus segmentorum 1-mi et 2-di abdominis vix exeuntibus, obtusissimis.

"Long. corp. ♂ et ♀ usque ad 5 mm.

"Color variabilis; griseo-flavescens, sæpe rubro tenuiter maculatum; rariter in parte anteriore vel omne rubro fuscissime pigmentatum, aspectu nigrum.

"Ova late ovalia, flavescentia, long. 0,4 mm."

"71. *Pherusa* sp.? an nova? (*inermis* m.)." Only the *habitaculum* is mentioned.

Gen. 55. *Dexamine*, Leach, receives, under 72. *Dexamine spiniventris* (Costa) Grube, "*Varietas pontica* mihi. Tab. viii. fig. 16. Caput marginibus ante-ocularibus dentiforme acute productis. Segmenta abdominis tria anteriora in margine posteriore dorsi denticulis lateralibus carentia, 3-ium et 4-tum denticulis anterioribus nullis, 6-tum dentibus tribus posticis fortibus. *Antennæ superiores* articulis 23-24, a. pedunculi 1-mo $\frac{1}{2}$ longitudinis 2-di longiore, infra in tuberculum obtusum fortem exeunte, articulis flagelli anterioribus filum olfactorium gerentibus; *a. inferiores* illis duplo breviores et tenuiores, articulis 16–17, 1-mo et 2-do brevibus, 2-do (articulus 1-mus Hell.) supra in denticulum exeunte. *Pedes paris 7-mi* tarso paulo breviore quam tibia. *Laminæ fotoriæ* feminæ elongatissimæ, in dimidio basali angustæ, dimidio apicali oblongo, cirris paucis marginatæ. Cetera ut a Hellerio observata. Long. corp. ♂ usque ad 6 mm., ♀ usque ad 7 mm. *Ova* ovalia, flavescentia,

long. 0,53 mm. Variatio. *A. Antennæ inferiores* superioribus paulo breviores, articulis 18-23. Variatio. *B. Antennæ inferiores* superiores longiores et fortiores, articulis 28 valde crescentibus, 1-mo infra in tubulum acutum (organ. audit.), 2-do supra producto, margine superiore ut 3-ii dense piloso; transitionem ad *D. spinosam* faciens."

"Subfam *b.* Stegocephalides, Sp. Bate and W.," contains Gen. 56. *Probolium*, Costa, Czerniavski not recognising that this had been anticipated by Dana's *Stenothoë*. He gives 73. *Probolium pontieum*, n. s., Tab, viii. fig. 17–23. "Proximum *Probolio* (Montagua) *monoculoïdi* (Mont., Sp. B.), epimeris utriusque speciei simillimis.

"Caput rostro brevissimo, obtuso. *Oculi* rotundi. *Antennæ superiores* usque ad dimidium segmenti 4-ti pertinentes, 10-articulatæ, pedunculo incrassato dimidio flagelli paulo longiore, articulis decrescentibus, flagello ad apicem sensim attenuato, articulis in apice filum olfact. gerentibus; *a. inferiores* breviores et multo debiliores, pedunculo æque longo ac superiorum, articulo 1-mo et 2-do brevissimis, junctis 3-io haud longioribus, 4-to paulo longiore quam 3-ius, flagello æque longo ac pedunculo, 5-articulato. *Pedes paris 1-mi* et *2-di* fere similes, carpo triangulari, manu subquadrangula antice leviter convexa, palma obliqua leviter convexa, spinulis minutissimis obsita, *p. 1-mi* palma æque longa ac margo posterior, postice spinulam minutam gerente, ungue crasso paulo curvato, *p. 2-di* multo majores et validiores, carpo postice anguste-producto, manu subtus latiore, palma multo longiore quam margo posterior, postice leviter excavata et denticulis spiniformibus 4 armata, ungue elongato leviter curvato. *Pedes ceteri* longitudine crescentes, tarso curvato subtus latiore, ungue forti, *p. 3-ii* et *4-ti* articulo 2-do (*basis* Sp. B.) haud multo dilatato, fere æque lato, 3-io antrorsum dilatato et in apice producto, *p. 5-ti, 6-ti, 7-mi* articulo 2-do retrorsum maxime dilatato et in apice rotundate producto, margine posteriore lævi, 3-io retrorsum dilatato et in apice producto, ungue curvo. *Pedes spurii* elongati, *p. 1-mi* et *2-di* ramis styliformibus leviter curvatis, æque longis ac pedunculus, inæqualibus, *p. 2-di* $\frac{2}{3}$ primi longitudine, *p. postremi* simplices, 3-articulati, articulis æque longis, 1-mo et 2-do spinis singulis (2–4) armati. *Telson* oblongum, lævе, postice rotundatum, marginibus lateralibus rectis. Long. corp. usque ad $2\frac{1}{2}$ mm. Color flavescens. Oculi rubri."

"Tribus B. *Saltatoria* Sp. B. and W.," contains Fam. 28. Orchestidæ Dana. In this he places Genus 57. *Nicea*, Nicolet, with *Hyale*, Rathke, *Amphithoe* (pars), M.-Edwards, Rathke, Grube, *Orchestia* (pars) Lucas, *Allorchestes* (pars), Dana, Bruzelius, Grube, in the synonymy. In the genus *Nicea* he gives 74. *Nicea istrica*, Grube, Tab. viii. fig, 24–25, which he describes, and "75. *Nicea Perieri* (Luc.) mihi. Tab. viii. fig. 26–27," with the synonymy, "*Orchestia Perieri*," Lucas, and "*Allorchestes Perieri*," Grube, describing "A. *Varietas pontica* m. Maxime proxima varietati maris Adriatici. Mas. *Antennæ superiores* segmentum 4-tum attingentes, articulis 12–16, *inferiores* usque ad segmentum 6-tum pertinentes, articulis 23–33. *Oculi* ovales vel suborbiculares. *Pedes paris 2-di* articulo 2-do antrorsum fortiter dilatato et in apice paulo subtus producto, 3-io antrorsum maxime rotundate-producto; *pedes posteriores* 3 articulo 4-to retrorsum dilatato. Femina: ut in varietate adriatica. *Laminæ fotoriæ* oblongæ, sat longe cirratæ. Long. corp. ♂ usque ad 6 mm., ♀ usque 5 mm. Color ut in præcedente [sordide flavescens, sæpe dorso rubrescente-flave scente]."

"B. *Varietas brevicornis* m. Mas. Præcedenti simillimus; sed antennæ abbreviatæ, paulo crassiores, *superiores* segmentum 3-ium pæne attingentes, articulis 11–12, *inferiores* usque ad segmentum 4-tum pertinentes, 14-articulatæ. *Oculi* ovales. *Pedes paris 2-di* articulo 2-do et 3-io ut in varietate Adriatica haud dilatatis. Long. corp. usque 6,6 mm. Color sordide-flavescens."

"Genus 58. *Orchestia* (+*Talitrus*) Leach," receives "76. *Orchestia Bottæ*, Edw.," Tab. viii. fig. 28–32, with "*O. constricta*, Cost.," "*O. littorea*, Grube," "*O. Montagui* (pars), Rathke," in the synonymy. A description of the species is followed by the description of a variety,

"*Varietas feminæformis* mihi. Tab. viii. fig. 33. *O. Bottæ* simillima, nisi *pedes 2-di paris* articulo 2-do oblonge-ovato, carpo haud abbreviato, longiore quam lato, in margine anteriore

convexo, manu subquadrangula, marginibus anteriore et posteriore parallelibus, palma vix obliqua, fere transversa, brevi, leviter convexa, spinosa, ungue leviter curvato, obtuso. 1 exempl. long. corp. 8,1 mm.; long. manus 2-dæ 0,66 mm."

"77. *Orchestia Montagui*, Aud. Tab. viii. fig. 34–39," has in the synonymy "*O. littorea*, Rathke," *Talitrus saltator*, M.-Edwards, Zaddach, Lucas, "*Talitrus locusta*, L., Sp. Bate and Westwood, *British Sessile-eyed Crustacea*, p. 16–23 (♀ et ♂ secund. ?), fig." Czerniavski remarks, "Species maxime variabilis, transitionibus gradatis cum *O. Bottæ* omnino juncta. Long. corp. ♂ usque ad 19,1 mm., long. manus 2-dæ usque ad 2,8 mm.; long. ♀ usque ad 18 mm., long. manus 2-dæ usque ad 0,8 mm." Whether the attendant remarks in Russian would throw any light upon the novel identification of *Talitrus* with *Orchestia* in this synonymy, I am unable to say.

The remaining species given are 78. *Orchestia mediterranea*, Costa, Tab. viii. fig. 40–41. 79. *Orchestia littorea*, Leach. "80. *Talitrus* (*locusta L.*) *saltator*, Edw. Tab. viii. fig. 42–44. Vide apud *O. Montagui* et *mediterranea*."

In the Appendix at page 130, under Amphipoda are given, 91. *Gammarus locusta* (L.). Gen. 66. *Amathilla* Sp. Bate and W. "92. *Amathilla carinata* (Rathke) Sp. Bate and W.," a species in the opinion of those authors doubtfully distinct from *Amathilla sabini*.

A remark in Russian is here made upon *Nicea pontica* and "*Nicea Pericri*."

"93. *Orchestia Deshayesii* Aud.," has a "*Variatio locutis*. Tab. viii. fig. 52–53. *Antennæ superiores* capite paulo longiores, dimidium articuli 3-ii inferiorum superantes, usque ad articulum 4-tum pertinentes, 8-articulatæ, *inferiores* dimidio corporis magis minusve breviores, articulis 18, 1-mo et 2-do brevissimis, 3-io iis junctis duplo longiore, dimidia longitudine 4-ti, flagello æque longo ac art. 4-tus vel illo breviore. *Oculi* suborbiculares. *Pedes paris 1-mi* spinulosi, carpo postice tuberculiforme producto, manu subtus dilatata, ungue curvato, acuto. *Pedes ceteri* spinulosi, *posteriores* 3 articulo 2-do subquadrato rotundato, art. 4-to subtus dilatato, *p. 5-ti* paulo longiores quam *p. 4-ti*, multo breviores quam *p. 6-ti; p. 7-mi* proximis paulo longiores. *Telson* triangulare rotundatum, fere æquilaterum. Color sordide flavescens. Mas. *Pedes paris 2-di* manu permagna subpyriformi, ad apicem maxime angustata, palma concava dimidium marginis posterioris occupante, dente subbasali valido acutoque, subtrorsum producto, apicem manus attingente, ungue valido curvato, cum dente quasi chelam formante, prædita. Femina. *Pedes paris 2-di* manu breviore quam dimidium manus maris, latissime subrhombea, palma transversa (per prolongationem subtrorsum laminis duabus ferme approximatis, a margine posteriore medio exhibitis, anteriore subquadrata, posteriore multo longiore angusta, plicata), profundissime bilobata, lobis ambobus inter se ferme approximatis (posteriore magis prolongato), apice rotundatis et molle spinulosis, ungue abbreviato, crasso, curvato, obtuso. Long. corp ♂ millim., ♀ 8 millim." The length of the male accidentally omitted.

As already hinted, in order to derive the full advantage offered by this work, the carcinologist who knows not Russian, must either find leisure to learn it, or venture on the perhaps more difficult task of finding an interpreter.

1868. Edward, Thomas, born Dec. 25, 1814 (Smiles), died Apr. 27, 1886 (Pall Mall Gazette).

Stray Notes on some of the smaller Crustaceans. Note I. On the Habits &c. of the *Hyperiidæ*. pp. 143–147. (Read June 21, 1866). Note II. pp. 165–170. (Read December 6, 1866.) The Journal of the Linnean Society. Zoology. Vol. IX. London, 1868.

This acute and ardent naturalist is able, from personal observation, to deny that the Hyperiidæ "exist *only* in the gill cavities of the medusæ." He maintains that they exist far more

commonly swimming freely. In regard to the species which had been established, he says, "I consider the genus *Lestrigonus* of Milne-Edwards and subsequent writers to be nothing more nor less than the male of *Hyperia*. I am led to this conclusion from the remarkable similitude which exists among them, and from the fact that in all the species (*five in number*) which I have met with, the sexes have always been associated, except in the case of *Lestrigonus Kinahani*." *Lestrigonus exulans* he positively identifies as the male of *Hyperia galba*. He has found the males, not yet described, of *Hyperia oblivia* and *Hyperia medusarum*, and of a new species, which he provisionally names *Hyperia minuta*.

Although *Lestrigonus kinahani* "may be, and is occasionally, found in company with *H. galba*, the one is easily distinguishable from the other. They are nothing alike, either in form or colour; not to speak of the long and slender antennæ of the one in comparison with those of the other. *H. Kinahani* is longish, more shrimp-like, especially behind, and not so round and dumpy as *H. galba*, and the colour is always much darker. The eyes too are dark instead of being of a light green." [Compare Note on Montagu, 1813]. He further says of *Lestrigonus kinahani*, "there appears to be little or no difference between the young and the old. They are both slender, and of a dark lead colour, and both have the remarkable long and hair-like antennæ."

In his second note Edward says that of *Hyperia oblivia* he has seen "thousands, nay, millions, or countless hordes." He has never found them parasitic on fish, but in examining the stomachs of herrings on two successive days, he found them all full of this Amphipod. "From one," he says, "I took 59, from another 47, and from a third 33; and all the others were more or less well crammed." As contrasted with "the vast legions which occasionally appear" of *Hyperia oblivia*, he says, "I have only taken *H. medusarum* on three or four occasions, and but a few each time. This species is decidedly the gem of the whole. It is partially pellucid, being beautifully banded, alternately, with rings of a crystal hue and others of a deep red. As regards *H. minuta*, I have only taken it twice, and even in fewer numbers than the last." Of the species just mentioned, he adds, "in their general manners all three resemble each other, their restlessness and activity being one of their most remarkable traits, and beyond the power of description. But if I were to particularise any of them as being more lively and more restless than the rest, I certainly should give *H. minuta* the character, as being the most active species which, so far as I remember, I have as yet seen. All three seem to me far more active in their whole movements than either of their congeners, *L. Kinahani* or *H. galba*, and they do much better in confinement."

"*Lestrigonus Kinahani* and *Hyperia galba* generally appear here [at Banff] about the beginning of July, and disappear again towards the end of September; *H. oblivia* usually about August, and continues till spring; *H. medusarum* in December, and remains till March (on one occasion I took two of this species as late as the mouth of May); and the time I found *H. minuta* was from October to December. During these periods, too, I have never failed to find the females of all, save the first, to contain, in some cases eggs, in others well-developed young. With reference to *H. oblivia*, I not unfrequently find females of this species with young from September to January, thus extending over a period of five months."

Recognising *Lestrigonus* as applying only to male forms of *Hyperia*, Edward retains the name only provisionally for "*Lestrigonus Kinahani*," to which he had not definitely been able to assign a female. He does not give authorities for the specific names he adopts, but there is good reason to believe that he uses the nomenclature of "The British Sessile-eyed Crustacea."

1868. Heller, Camil.

Reise der österreichischen Fregatte Novara um die Erde in den Jahren 1857-58-59 unter den Befehlen des Commodore B. von Wällerstorf-Urbair. Zool. Theil. 2. Bd. 3. Abth. Crustaceen. Mit 25 Tafeln. Wien. 1868. Amphipoda, pp. 128–9. Pl. XI. Fig. 4. 5, 5a–c. (Tanais. pp. 133–4. Pl. XI. Fig. 3.)

The new species of Amphipoda described and figured are, 1. "*Allorchestes Paulensis*," which is stated to be rather like *Allorchestes verticillata*, Dana, apparently belonging to the genus *Hyale:* 2. "*Anonyx Chilensis*," said to approach the genus *Callisoma* in the almost cheliform structure of the second gnathopod, but appearing to correspond more nearly, so far as described, with Boeck's genus *Orchomene*.

As only two or three pages referring to the Amphipoda are embalmed in this handsome and expensive work, for the benefit of students who may not be able to consult it, I here append the Latin descriptions of the new species:—

Allorchestes paulensis, "antennæ secundæ primis fere duplo longiores, pedunculo et flagello fere æque longis, articulo pedunculi secundo tertio breviore, flagello 12-articulato, articulis oblongis, setis brevibus dense verticillatis. Antennæ primæ nudiusculæ, flagello pedunculum paulo superante, 11-articulato. Pedes primi parvuli, secundi sat fortes, manu subovata palma inferiore rectiuscula pubescente, dactylo longo; antibrachio infra producto. Pedes quinti, sexti septimique subæqui, breves, setis paucis sparsis instructi. Abdominis segmentum ultimum latum, postice arcuatum. Longitudo 12 millim."

Anonyx chilensis, "Oculi reniformes. Antennæ primæ secundis plus duplo breviores, pedunculi articulis duobus ultimis brevissimis, flagello pedunculo longiore 11–12-articulato. Antennæ secundæ fere dimidiam corporis longitudinem æquantes, pedunculo dimidium flagelli antennularum superiorum attingente, supra ciliato, flagello 24–25-articulato, parce setoso. Pedes antici subcheliformes breves; secundi elongati, graciles, cheliformes. Abdominis segmentum ultimum acutum, medio divisum. Longitudo 7 millim."

1868. Hesse, Eugène.

Observations sur des Crustacés rares ou nouveaux des côtes de France. 15me art. Description d'un nouveau Crustacé appartenant au genre *Limnorie*. Annales des Sciences Naturelles. 5ème sér. Zool. et Paléont. X. Paris, 1868. pp. 101–120. Pl. 9.

Under the name *Limnoria xylophaga*, as though the species were new, *Chelura terebrans*, Philippi, is elaborately described and figured. Hesse considers that the function of respiration is discharged not only by the "vésicules branchiales" at the base of the peræopods, but also by the "fausses pattes branchiales flabelliformes" (*i.e.*, the anterior pleopoda). The heart, he says, is a longitudinal, cylindrical vessel, reaching from the base of the head with a gradual contraction to end in a point at the extremity of the seventh peræon-segment. The stomach and digestive tube have very solid walls, suitable to the ligneous diet of the animal. Of the "pattes thoraciques" he says there are seven pairs, which all have four or five joints. [As a matter of fact they have the usual number]. Of the eyes he states that they are not, as usual, "recouverts d'une cornée simple dans laquelle sont enchassées des cornéules, qui forment un ensemble collectif; ces cornéules paraissent, au contraire, composées de lames plates et squameuses, indépendantes, fixées verticalement par la base et

groupées circulairement autour d'un centre vers lequel elles convergent et s'inclinent ou se redressent, suivant l'occurrence de manière à augmenter ou à diminuer les saillies et conséquemment à éviter les dangers du contact." This seems to want confirmation.

1868. Jarschinski, F. (? Iarzynsky, Th.)

[On the Leydigian organs at the antennæ of the Crustacea Amphipoda. Transactions of the first meeting of Russian naturalists at St Petersburg, 1868, 4to, pp. 176–179 (written in Russian).]

"The so-called Leydigian organs on the first pair of antennæ, first observed by La Valette in *Gammarus puteanus*, and afterwards accurately described and stated to be sensitive organs by Leydig, are the subject of a paper by F. Jarschinski (*l. c.*), who has observed them in various genera of Amphipoda." (Dr. von Martens, Zool. Record for 1870.)

1868. Joseph, Gustav.

Jahresbericht der schlesischen Gesellschaft für vaterländische Kultur. Jahrgang 1868.

Fries refers to a paper in the above Transactions, and another in "Amtl. Bericht der Münchner Naturforscher-Versammlung, 1877 (p. 172)," in which G. Joseph records the occurrence of a blind Gammarid (*Niphargus orcinus*, n. s.) in the brooks of the hill-grottoes of Carniola, which probably from these reaches the lake of Zirlenitz, where it can be freely gathered. It comes to the surface after sunset in calm weather.

1868. Martens, Eduard von, born 1831.

Crustacea. The Record of Zoological Literature. 1867. Volume Fourth. London, MDCCCLXVIII. pp. 611–622.

Packard's new species, *Monoculodes nubilatus*, mentioned on p. 613, is called *Monoculodes nubeculatus* on p. 617. It is stated that "the genus *Pontoporeia* is reunited with *Lysianassa*" by G. O. Sars in his Hist. Nat. des. Crust. d'eau douce de Norvége, p. 82, note. But Sars only says, "il vaudrait peut-être mieux les réduire, en attendant, à un seul genre." In the text he retains the name *Pontoporeia*.

1868. Martens, Eduard von.

Ueber einige ostasiatische Süsswasserthiere. Archiv für Naturgeschichte. Vier und dreissigster Jahrgang. Erster Band. Berlin, 1868. pp. 1–64.

At page 56, under the heading "Tetradecapoden," Martens notices the continental and terrestrial habits of some members of the genera *Gammarus*, *Talitrus* and *Orchestia*. In Madeira he had met with a *Gammarus*, which was more frequently to be found on the banks of the brooks than under water; in Japan an *Orchestia* presented itself "am Waldrande, zwischen abgefallenem feuchtem Laube, aber doch nicht im Wasser." After referring to Dana's *Orchestia sylvicola* from New Zealand and *Orchestia tahitensis* from Tahiti, and Heller's *Orchestia cavimana* from Cyprus, he describes the Japanese species as *Orchestia humicola*,

with the description :—"Die vier vordern Epimeralstücke verhältnissmässig gross, gerundet, das fünfte etwas kürzer und viel schmäler als das vierte. Die obern Fühler nicht länger als das erste Basalglied der untern. Diese halb so lang als der Körper, die Geissel ungefähr eben so lang als der Stiel. Glieder der Geissel kurz. Zweites Fusspaar fast doppelt so lang wie das erste mit einer kleinen, flachen, länglich-elliptischen Hand, deren Daumen kaum zu erkennen ist. Drittes und viertes Fusspaar um weniges länger, aber dünner, mit einfachem spitzigem Endgliede, wie die folgenden; das fünfte wiederum etwas länger, sonst gleich. Das sechste und siebente unter sich gleich, sehr lang und kräftig. Afterfüsse mit mehreren kurzen Endborsten, aber an den Seiten ohne Borsten." The genus *Amphitoë*, without the accessory flagellum that distinguishes *Gammarus*, is not, he remarks, found in the fresh waters of Europe, although in Eastern Siberia "Amphitoë muricata Pall. sp." is found in the Angara (Jenisei), and in North America Amphitoe dentata, Say, in the fresh-water marshes of South Carolina. Corophium, the Hyperina, and the Læmodipoda, have, so far as he knows, no fresh-water representatives. It is not, I should think, by any means certain that Say's "*Ampithoe dentata*" really belongs to the genus *Amphithoë* as now accepted, while the *Oniscus muricatus* of Pallas is clearly excluded from it by having an accessory flagellum.

1868. Milne-Edwards, Alphonse.

Description de quelques Crustacés nouveaux provenant des voyages de M. Alfred Grandidier à Zanzibar et à Madagascar. Nouvelles archives du Muséum d'histoire naturelle de Paris. Tome Quatrième. Paris, 1868. pp. 69–92.

Caprella megacephala, n. s., from Cape Sainte-Marie, where it was dredged up from a rocky bottom at a considerable depth, is described on pages 89–91, and figured pl. 20, figs. 12, 13. The chief character relied on seems to be the head, of which Milne-Edwards says, "chez le mâle, la tête, légèrement renflée, est arrondie en avant, et ne porte ni pointe ni tubercule; elle se rétrécit un peu postérieurement, mais on n'aperçoit cependant pas le sillon qui la sépare du premier anneau thoracique, avec lequel elle est complétement confondue. La pièce, ainsi constituée, est remarquablement allongée." After further description, the remark is made, "la *Caprella scaura* (Temp.) provient de la même localité; elle se rapproche davantage de notre espèce, à raison de la longueur du premier segment, mais la tête est surmontée d'une pointe conique et les pattes de la deuxième paire sont pourvues d'une main tridentée en dessous." The corresponding hand in this species is described as "très-longue, cintrée en dessus ou en avant, pourvue sur son bord postérieur de deux denticules très-éloignées l'une de l'autre. Le doigt terminal est robuste, très arqué, et offre, près de sa base sur son bord supérieur, une petite échancrure ou encoche." In *Caprella januarii*, Dana, from Rio Janeiro, the hand is more elongate "et pourvue de trois denticulations en dessous." Mayer thinks that Milne-Edwards' species may just possibly be *Caprella æquilibra*, Say.

1868. Norman, A. M.

On Crustacea Amphipoda new to Science or to Britain. The Annals and Magazine of Natural History. Series 4, Vol. ii. December, 1868. London, 1868. Plates XXI., XXII., XXIII. figs. 1–11.

This paper gives the definition of the genus *Haploops*, Lilljeborg, which includes the character "eyes two, simple," but the British specimens of *Haploops tubicola*, Lilljeborg, are described

as agreeing with those found by Torell off the coast of Greenland, in having *four* simple eyes. "The number of eyes, therefore, would not seem to be constant." Compare Note on Goës, 1865.

A new genus, *Tessarops*, is thus defined :—"Eyes four—two (large, compound) situated above the origin of the superior antennæ, and two (nearly simple) below the others, at the base of the superior antennæ. Superior antennæ furnished with a very slender secondary appendage. Both pairs of gnathopods simple, not subchelate. Last pereiopods short, stout. Pleon having dorsal margins of segments toothed. Telson squamiform. Last uropods two-branched." To the description of the species *Tessarops hastata* are prefixed as possible synonyms, *? Tiron acanthurus*, Lilljeborg, 1865, and *? Syrrhoe bicuspis*, Goës, 1865. Boeck has decided that the three species named are in fact but one, and that *Tiron acanthurus* has priority.

A new species, "*Mœra Batei*," is described and figured. Attention is called to the difference in size and structure of the second gnathopod in the two sexes of this genus. *Megamœra othonis* is assigned as female to *Megamœra longimana*, *Megamœra alderi* as female to *Melita obtusata*, to which *Melita proxima* is united "as another and the more usual form of the male."

The genus *Megamœra*, Bate, is thought to be in effect not distinct from *Mœra*.

The new genus *Helleria* is thus defined :—"Eyes compound. Superior antennæ slender, much shorter than inferior, with[out] secondary appendage. Both gnathopods subchelate. Last pereiopods rather short, furnished with long plumose setæ. Fifth and sixth segments of pleon coalesced into one. Last uropods two-branched. Telson squamiform, cleft almost to the base." The new species is named *Helleria coalita*. But the name *Helleria* must be changed, being preoccupied among Isopoda.

1868. NORMAN, A. M.

Preliminary Report on the Crustacea, Molluscoida, Echinodermata, and Cœlenterata, procured by the Shetland Dredging Committee in 1867. Report of the Thirty-seventh Meeting of the British Association for the Advancement of Science; held at Dundee in September 1867. London, 1868. pp. 437–441.

"As a rule," Mr. Norman observes, "those Amphipods which occur also on the British coast attain a much greater development within the Arctic circle." He notices, without naming, new species of *Atylus*, *Cyrtophium*, *Corophium*, *Pleustes?*, and one "allied apparently to *Calliopius*," with "a new genus allied in general characters of eyes, of gnathopods, and pereiopods, especially in the broadly flattened meros and carpus of the last pair, to *Haploops*, but having the antennæ furnished with an appendage."

1868. PLATEAU, FÉLIX.

Recherches sur les Crustacés d'eau douce de Belgique. 1e Partie. Genres *Gammarus*, *Linceus* et *Cypris*. Mémoires Couronnés Acad. Roy. de Belgique, XXXIV. 1868. 1 Pl.

The Annals and Magazine of Natural History, Ser. 4, Vol. iii. p. 12.

"*Gammarus puteanus* (Koch) is not blind, but sensible to light." (Zool Record, 1870.)

1868. Sars, Michael.

Fortsatte Bemærkninger over det dyriske Livs Udbredning i Havets Dybder. (Særskilt aftrykt af Vidensk.-Selsk. Forhandlinger for 1868.) pp. 246–275.

On p. 260 twenty species of Amphipods are mentioned as occurring at depths between 250 and 300 fathoms. For one of them, "*Lysianassa magellanica*, Lilljeborg, vix M.-Edwards," the depth is given, 300 to 400?

1868. Wagner, Nicol.

[*Hyalosoma dux*, a new form of Amphipod Crustacea. Transactions of the first meeting of Russian Naturalists at St. Petersburg, 1868. pp. 218–238, 4 pls.]. Zool. Record for 1870.

Of this paper, which I have not seen, Messrs Friedländer assure me that the exact title in German is:—"Hyalosoma dux, eine neue Form aus der Gruppe der Daphniden," so that the attribution of *Hyalosoma* to the Amphipoda is no doubt accidental.

1869. Bessels, Emil.

Einige Worte über Entwickelungsgeschichte und morphologischen Werth des kugelförmigen Organes der Amphipoden. Jenaische Zeitschrift für Medicin und Naturwissenshaft. Bd. V. Jena, 1869. pp. 91–101.

"E. Bessels has given a *résumé* of his researches into the development of these Crustaceans [Amphipoda], the detailed description having been unfortunately lost during his journey." (Zool. Record, 1870).

1869. Cajander, Alfred Henrik, born 1843, died 1868 (Note to his Contribution).

Bidrag till kännedomen om sydvestra Finlands krustaceer. Notiser ur Sällskapets pro Fauna et Flora fennica förhandlingar. Tionde häftet. Ny serie. Sjunde häftet. Helsingfors, 1869. pp. 371–376.

He remarks that the Crustacea of Finland were all but uninvestigated up to that time. In the list which he here gives only one Amphipod is included, thus mentioned:—"*Corophium longicorne* Latr. Ålands och Åbo skärgård h. o. d." The notes say, "h. o. d. = här och der," and "När en art uppgifves för skärgården menas dermed, att den forekommer i hafvet." The author's early death precluded him from advancing the subject.

1869. Dallas, William Sweetland, born January 31, 1824 (W. S. D.).

Observations on the Amphipoda occurring on the Norwegian Coasts. By Axel Boeck. Translated from the Forhandlinger ved de Skandinaviske Naturforskeres, Ottende Möde, 1860, pp. 631–677, by W. S. Dallas, F.L.S., etc. The Annals and Magazine of Natural History, Ser. 4, Vol. iii. May and June, 1869.

1869. Forel, F. A.

Introduction à l'étude de la faune profonde du lac Léman. Bulletin de la Société Vaudoise d'Histoire Naturelle. Tome X. No. 62. 1869. pp. 220–224.

"One species of *Gammarus*, two of *Cyclops*, two of *Daphnia*, two or three of *Cypris*, have been found at a depth of 75 meters, about 250 feet, in the *Lake of Geneva;* at 300 meters one species of the order Amphipoda, one *Cypris*, one *Cyclops*." (Zool. Record, 1870.)

1869. Grube, A. E.

Mittheilungen über St. Vaast-la-Hougue und seine Meeres-, besonders seine Annelidenfauna. Verhandlungen der schlesischen Gesellschaft für vaterländische Kultur. 1869. pp. 1–39. Taf. 2.

In this paper Grube describes and figures "Urothoë marinus Sp. Bate.? var. pectinatus Gr.," in which the third peræopod appears not only very much broader and flatter than either of the following pairs, but has the hand and two preceding joints in their whole breadth on the lower rim, the hand and wrist also in the centre, armed with a comb of spines. The telson is split only to the centre, and is much longer than broad. Other differences concern the last uropods and the eyes. At page 35 a list is given of the Amphipods, eight species, which Grube obtained at St. Vaast.

1869. Heller, Camil.

Zur näheren Kenntniss der in den süssen Gewässern des südlichen Europa vorkommenden Meeres-crustaceen. Zeitschrift für wissensch. Zool. XIX. Bd. 1. Heft. Leipzig, 1869. pp. 156–162.

Of "Gammarus Veneris, Heller," he says, we have in this species obviously a *Gammarus marinus*, cut off from the sea and forced to live in fresh water, becoming changed accordingly to suit its new conditions of life. His *Orchestia carimana* he considers in like manner derived from "*Orchestia Montagui*."

1869. Hilgendorf, Franz.

Von der Decken's Reisen in Ost-Afrika in den Jahren 1859 bis 1865. 3 Bd. 1 Abth. Zoologie. Crustaceen. Bearbeitet von Franz Hilgendorf. Mit fünf lithographirten Tafeln. Leipzig, 1869.

In the "Uebersicht der ostafrikanischen Crustaceen," pp. 103–115, he names the following Amphipoda, "*Talitrus Cloquetii*, Aud.," "*Orchestia Botta*, M. E.," "*Orchestia inæqualis*, Hell.," "*Orchestia Deshayesii*, Aud.," "*Amphithoë filosa*, Sav.," "*Amphithoë costata*, M. E.," "*Amphithoë Fresnelii*, Aud.," "*Leucothoë furina*, Sav.," and under the head of Læmodipoda he gives "*Caprella scaura*, Templet.," and "*Caprella nodosa*, Templet."

1869. Martens, Eduard von.

Crustacea. The Record of Zoological Literature. 1868. Volume Fifth. London, MDCCCLXIX. pp. 510–533.

Martens notes *Tessarops hastata*, n. g. et. s. "to be compared with *Tiron acanthurus* (Lilljeb.) and *Syrrhoë bicuspis* (Göes)." Boeck places the three together under the name *Tiron*

acanthurus. On the new genus, *Helleria*, Norman, in the Annals and Magazine, 1868, Martens observes that "the paper is published in the December part, therefore later than *Helleria* of Erber," Verhandl. zool.-bot. Gesellsch. Wien, xviii. 1868, pp. 95–114, pl. 1.

1869. Münter, Julius, died February 2, 1885 (Friedländer, Naturæ novitates), and Buchholz, Rudolph, died April 17, 1876 (Taschenberg).

Ueber *Balanus improvisus* Darw. var. *gryphicus* Münter. Beitrag zur carcinologischen Fauna Deutschlands. Mittheil. a. d. naturwissensch. Verein v. Neu-Vorpommern u. Rügen. I. 1869. pp. 1–40.

In the Crustacean Fauna of their district, the authors say, "aus der Ordnung der Amphipoden sind bis jetzt nachgewiesen:—*Gammarus Locusta Fabr.*, *G. fluviatilis Edw.* (*pulex L.*) und *G. ambulans Fr. Müller*: ferner *Corophium longicorne Latr.*, *Talitrus saltator Milne Edw.*, *Orchestia Euchore Fr. Müller*, *O. Gryphus Fr. Müller* und *Leptocheirus pilosus Zaddach*."

1869. Nardo, Giovanni Domenico.

Annotazioni illustranti cinquantaquattro specie di crostacei Podottalmi, Endottalmi [Edriottalmi] e Succhiatori del mare Adriatico, alcune delle quali nuove o male conosciute, accompagnate da trentatre figure litografate, e precedute dalla storia della carcinologia Adriatica antica e recente. (Presentata il 27 dicembre 1868.) Memorie del R. Istituto Veneto. Vol. XIV. Venezia, 1869. pp. 217–343. Tav. XII.–XV.

The Bibliography extends from the year 1524 to the year 1868, occupying the first part of the work. The second part, pages 283 to the end, is concerned with the fifty-four species mentioned in the title. The "Edriottalmi amfipodi" are described on pages 330–332. First Nardo gives "Sp. 46.) Orchestia littorea? Leach. *Cancer locusta*, L., Chier., sp. 58, fig. 74.—Volg. *Saletto de fosso*," with a note to the effect that, since his work in 1847, he had noticed characters which seemed to distinguish this species from *Orchestia littorea*. Fig. 9, on pl. xv., purporting to be copied from Chiereghin, negatives all idea of an *Orchestia*, the upper antennæ, though shorter than the lower, being far too long for that genus. The proportions of the antennæ, coupled with the large rami of the third uropods, would point rather to some genus like *Cheiroceratus*, Norman.

Nardo next gives "Sp. 47.) Lysianassa? . . . . . *Cancer sabrctus*, Chier., sp. 59, fig. 75.—Volg. *Saletto de mar*." He repeats the Latin description quoted in 1847, and adds an Italian quotation, "L'esterna superficie di tutto il corpo, aggiunge, rilevasi liscia e tutta seminata di piccole macchiette di color rosso sopra un fondo biancastro, ed ha sul margine superiore tanto del quinto che del sesto pezzo delle articolazioni del tronco caudale, un paro per cadaun pezzo di lunghetti, sottili ed avvicinati pungiglioni, rivolti verso la parte posteriore. Abita il nostro golfo ne'siti fangosi. Non serve ad alcun uso per essere minutissimo, ed è difficile raccoglierne in qualche numero." The extreme minuteness of the specimen leads Nardo to suspect that it had not attained its full development. Chiereghin's figure is reproduced, pl. xv. fig. 8, with a line a tenth of an inch long to show the natural size. The upper antennæ are much shorter than the lower, but filiform,

quite unlike those of *Lysianassa*. Five short filiform legs are represented, followed by two very long ones, with the first joint in each dilated, the rest slender. The pleon is elongate.

"*Genere* LUSYTA, Nardo," follows, containing

"Sp. 48. LUSYTA ALGENSIS, Nardo; *Sinon. moderna cit. Cancer algensis*, Chier., sp. 60, fig. 76–79. *Podoceros* . . . . . Leach.; *Annot. ant. all'opera ms. del Chiereghin.*" Nardo says that Leach wrote with his own hand at the foot of the page containing the figure given by Chiereghin, the generic name *Podoceros*, without indicating the species. Nardo himself considers it to differ from *Podoceros* and also from *Cerapus* and *Cerapodina*, though like the two last, especially from its habit of living in a case. As the genus is not separately defined, its characters must be derived from those which are said to be the essential ones of the species:—"Estremita della testa un poco prolungantesi in rostro; occhi posti lateralmente alla base di tal rostro, alquanto peduncolati; due lunghe antenne sorgono dal dissotto del rostro terminate in punta; hanno ciascuna nove articolazioni, e lungo il loro lato inferiore dei lunghi sottilissimi peli; al dissotto ne sorgono altre due più corte, di sole sei articolazioni, pelose anch' esse come le prime.

"I primi due piedi sono grossetti, eguali, di cinque articolazioni, aventi il quarto pezzo più grosso degli altri, e su di questo nasce un dito incurvato verso l'ingiù, terminante in punta ed atto a piegarsi sul lato inferiore del detto quarto pezzo.

"Seguono cinque altri piedi per ogni lato. I tre primi paja sono sottili, composti di sei pezzi, l'ultimo de'quali termina in una punta rivolta un poco verso l'ingiù. Gli altri due paja sono un poco più grossi e più lunghi coll'ultimo pezzo che è più ingrossato e parimenti terminante in punta alquanto più aguzza. Altri due paja di piedi analoghi, sono posti sotto l'ottavo pezzo. Nel quinto, sesto e settimo nascono invece che piedi delle appendici membranose e filamentose.

"La superficie del corpo è liscia e di color bianco candido."

Its dwelling is said, on Chiereghin's authority to be on the leaves of the *Zostera marina* in tubes shaped like a *Cornucopia*, formed of very fine threads agglutinated together, out of which it thrusts its upper half, when seeking food, and by rapidly waving its arms and antennæ puts the water into movement to draw small animals towards its mouth. The original Latin definition is quoted, without the improvements upon the Latinity given in 1847, thus:—"*Cancer algensis, macrourus, thorace rostrato, manibus adactylis, pedibus decem, termine caudæ triphylo.*" The figures 7, 7*b*, on plate xv., show the shape of the tube, slightly curved, narrow at one end, widening gently to the mouth at the other extremity; figures 7*a*, 7*c*, portray the animal very indistinctly, but with the upper antennæ decidedly longer than the lower, which is unsuitable to *Podocerus*. The description of "i primi piedi," *i.e.*, evidently the second gnathopods, suits the genus *Cerapus*, but in the well-ascertained species of that genus the tubes are straight, and open at both ends. J. V. Carus 1885, gives *Lusyta*, Nardo, as a synonym of *Podocerus*, Leach, but without explanation and without mention of the species *algensis*.

The "Edriottalmi lamedipodi" are described on pages 323–324. In this division Nardo gives "Sp. 49.) CAPRELLA LINEARIS, Milne Edw. *Cancer linearis*, L., Chier. sp. 61, fig. 80. — — Olivi; *Zool. Adr. Oniscus Linearis*, Latr., Martens; *Reise nach Venedig*, p. 497." He says that in 1847 he erroneously marked it as "*Caprellæ nova species?*" He finds that it differs from *Caprella monocantha* [*monacantha*], Heller, by not having the spine at the base of the second pair of feet, and some other trivial characters. Heller's species is identified by Haller and Mayer with *Caprella æquilibra*, Say; Mayer gives up Nardo's species as undecipherable. The fig. 4, on plate xv., however, will fairly suit *Caprella æquilibra*, in which the spine above-mentioned has escaped the notice even of good observers.

He next mentions "Sp. 50.) Caprella Fabris, Nardo. *Cancer linearis*, L., *varietas*. Chier., sp. 61, fig. 81–82. *Caprellæ nova species?* Nardo; *Sinon. mod.* citata." The specific name, he says, was omitted in the "sinonimia" by a typographical error. He finds it very near to, if not the same as, *Caprella armata*, Heller. Both are by Mayer made synonyms of *Caprella acanthifera*, Leach. It is figured on pl. xv. figs. 5, 5*a*, the magnified figure leaving no doubt of its identity.

The last species is "Sp. 51.) Caprella Cornalia, Nardo," not derived from Chiereghini's work. Nardo recognises its likeness to *Caprella acutifrons*, Heller [Latreille], with which the description and figure, pl. xv. fig. 6, justify Mayer in identifying it beyond doubt.

1869. Norman, A. M.

Notes of a Week's Dredging in the West of Ireland. By George Stewardson Brady, C.M.Z.S., and David Robertson. The Annals and Magazine of Natural History. May, 1869. Ser. 4. Vol. III. London, 1869. pp. 353–373. Pls. 21, 22. (The Amphipoda and Isopoda by the Rev. A. M. Norman.)

Numerous species of Amphipoda are recorded, with occasional notes on the nomenclature. The genus *Erunguia* is thus defined:—"Antennæ short and strong; flagella rudimentary, upper pair without a secondary appendage. Body wide; coxæ shallow. First gnathopods long, slender, filiform; dactylos obsolete. Second gnathopods subchelate, slender, but yet much stouter than the very delicate first pair. Pereiopods rather short, subequal; propodos longer than carpus. Uropods all two-branched; branches short, simple. Telson squamiform.

"This genus seems to be most nearly allied to *Cratippus*, from which it is distinguished by the remarkable character of the first gnathopods." The type species, *Erunguia stilipes*, is also fully described, and partly figured, pl. xxii. figs. 7–12.

The genus is, like *Cratippus*, Sp. Bate, a synonym of *Colomastix*, Grube, 1861. The species is no doubt the same as *Cratippus tenuipes*, and probably also the same as *Colomastix pusilla*, Grube.

1869. Saenger, N.

[Preliminary account of an exploration of the Fauna of the Baltic] in [Communications of the Imp. Society of Nat. Sc., Anthropol. and Ethnol. of the Univers. of Moscow] vol. viii. 1869, pp. 22–34.

"The journal and paper are written in the Russian language." "At Reval . . . occur . . . species of *Crangon*, *Mysis*, *Gammarus*, and *Corophium longicorne* (Fabr.) at about 40 feet." (Zool. Record, 1870.)

1870. Beneden, Édouard van.

Recherches sur la Composition et la Signification de l'Œuf, basées sur l'Étude de son Mode de Formation et des premières Phénomènes embryonnaires (Mammifères, Oiseaux, Crustacés, Vers). *Mém. couronnés et Mém. des savants étrangers publiés par l'Académie Royale de Belgique.* Vol. XXXIV. 1870. 283 pp., 12 pl. (Crustacea, pp. 107–143, Pl. VII.–X.).

1870. Beneden, Édouard van, et Bessels, Émile.

Mémoire sur la Formation du Blastoderme chez les Amphipodes, les Lernéens et les Copépodes. Mém. cour. Acad Roy. de Belgique. Vol. XXXIV. 1870. 59 pp. 5 pl.

"The development of the ovum of various orders of Crustacea is the subject of several papers by Ed. van Beneden. . . . It is very remarkable that there is a difference between the fresh-water and marine species of *Gammarus*; in the latter the separation of deutoplasm and protoplasm occurs immediately after the complete cleaving of the yolk, as in *Chondracanthus* and the Copepods; in the fresh-water species, on the contrary, the deutoplasm is not included in the multiplication of the egg-cells. An abstract of these papers will also be found in the Quart. Journ. Microsc. Scienc., January 1870, pp. 81–84." (Zool Record., 1870.) Compare Note on Claus, 1884. For *Dermophilus lophii*, see Note on Huxley, 1877.

1870. Beneden, Pierre Joseph van.

Les Cétacés, leurs commensaux et leurs parasites. Bulletins de l'Académie royale des sciences, des lettres et des beaux-arts de Belgique. Trente-neuvième année.—2me Série, T. XXIX. Bruxelles, 1870. pp. 347–368.

Van Beneden says at the outset, "Nous ferons suivre le nom des cétacés de l'énumeration des commensaux et des parasites qu'ils hébergent." He then gives "Balæna mysticetus. Cyamus ceti Linn.—*Cyamus oralis*. Ce crustacé, commensal comme les Cirripèdes, vit sur la peau et a été signalé par la plupart des baleiniers qui ont fait la pêche au Nord." Lütken objects to the synonymy here given, and also to classing the parasitic *Cyamus* with animals that are merely *commensaux*. The next entry referring to the Amphipoda is "Balæna biscayensis, Eschr. Cyamus biscayensis. Le docteur Monedero a publié la figure qui représente la jeune baleine qui a été capturée en 1854 sur la plage de Saint-Sébastien, dans le golfe de Gascogne, et à côté de la baleine il a donné le dessin d'un Cyame qui a été probablement trouvé sur elle. Malheureusement on n'en a pas conservé pour les comparer." Under these circumstances it is a rather strong measure, as Lütken thinks, to establish a new species.

Under *Balæna australis*, is mentioned *Cyamus erraticus*, Roussel de Vauzème, and two figures are given, with the remarks that Roussel de Vauzème "admet trois espèces sous les noms de *Cyamus oralis*, *Erraticus*, et *Gracilis*. Nous avons tout lieu de croire, comme le pensaient Audouin et Milne-Edwards, que ce naturaliste n'a pas tenu assez compte des modifications que l'âge apporte dans la forme. Nous avons trouvé de jeunes animaux au milieu d'adultes auxquels les caractères du *Gracilis* convenaient fort bien. Nous reproduisons la forme d'un de ces jeunes individus." Lütken upholds all the three species as distinct. Van Beneden refers also under this heading to Latreille's three species of *Cyamus*, two brought by De Lalande from the Cape of Good Hope, the other coming from some eastern Cetacean.

Under *Physeter macrocephalus*, he mentions "Oniscus. L'espèce n'est pas indiquée; occasionally adhere to the skin, dit F. Debell Bennet." "*Proc. Zool. Soc.*, 1837 april, p. 30."

Under *Hyperoodon* (*rostratum*) *butzkopf*, he mentions "Cyamus (Platycyamus) Thompsoni (Gosse). Ce Lœmodipode vit également sur la peau mais sans s'y fixer."

Under *Globiceps melas* he mentions, "Cyamus globicipitis, Lutk. Comme les autres Cyames, on l'a trouvé à la surface de la peau.

Under *Monodon monoceros* he mentions "Cyamus monodontis et C. nodosus Lutk. Ces Cyames sont signalés sur ce cétacé par M. Lutken."

In the concluding observations he says, "Parmi les commensaux libres se trouvent les Cyames qui se cramponnent à la peau des Mysticètes et sur plusieurs Cétodontes. C'est le seul commensal de la baleine du Groënland."

1870. Boeck, Axel.

(Appendix by Lütken).

Crustacea amphipoda borealia et arctica. (Særskilt aftrykt af Vidensk.-Selsk. Forhandlinger for 1870.) 200 + viii. pages.

In this prodromus to his greater work, Boeck accepts only two divisions of the Amphipoda, which he calls "Hyperidæ. Dana 1852," and "Gammaridæ Dana 1849," although in point of fact, the names which Dana employed for his subtribes of the Amphipoda in 1849 were Gammaracea and Hyperiacea, and in 1852 were Caprellidea, Gammaridea and Hyperidea.

In the division *Hyperidæ* Boeck includes two families, Hyperidæ and Tryphanidæ. Among the former he describes *Metoecus abyssorum*, n. s., which he afterwards called *Tauria abyssorum*, by G. O. Sars identified with *Tauria (Onisens) Medusarum*, O. Fabr., 1780, for which see Note on Bovallius, 1885. In a new genus, *Parathemisto*, he includes *Themisto compressa*, Goës, and *Parathemisto abyssorum*, n. s., synonymous, according to G. O. Sars, with *Hyperia oblivia*, Sp. Bate (non Krøyer), so that the name will be *Parathemisto oblivia*. To *Themisto*, Guérin, he assigns *Gammarus libellula*, Mandt, and *Themisto bispinosa*, n. s. In his family Tryphanidæ, he places the new genus and species, "*Tryphana Malmii*," but according to G. O. Sars, the genus *Tryphana* is a synonym of *Lycæa*, Dana, in the family Typhidæ, as limited by Claus.

In the division *Gammaridæ* he places :—

Family I. Prostomatæ, containing only *Trischizostoma raschii*, Esmark and Boeck.

Family II. Orchestidæ, with three genera, *Orchestia*, *Talitrus*, and *Hyale*.

Family III. Gammaridæ, with twenty-two subfamilies, as follows :—Subfam. I. Lysinassina (æ), Dana, 1849, comprising, together with species not new, *Lysianassa plumosa*, n. s., which, according to G. O. Sars, is the male of *Lysianassa costæ*, Milne-Edwards; "*Ambasia Danielssenii*," n. g. et s.; *Ichnopus minutus*, n. s.; *Socarnes*, a new genus doubtfully identified with *Ephippiphora*, White, 1848; *Callisoma*, Costa, 1851; *Hippomedon*, a new genus to include *Anonyx holbøllii*, Krøyer, and *Lysianassa abyssi*, Goës; *Cyphocaris anonyx*, n. g. et s., named by Lütken, but described by Boeck; *Eurytenes*, Lilljeborg; *Aristias*, a new genus to receive *Anonyx tumidus*, Kroyer; *Anonyx*, Krøyer, with a new species, "*Anonyx Lilljeborgii*;" *Onisimus*, afterwards corrected to *Onesimus*, n. g., doubtfully identified with *Atibrotus*, Milne-Edwards, 1840, but not including any new species; *Menigrates*, a new genus to receive Boeck's own species, *Anonyx obtusifrons*; *Orchomene*, a new genus embracing *Anonyx pinguis*, Boeck, *Anonyx serratus*, Boeck, *Anonyx minutus*, Kroyer, *Lysianassa umbo*, Goës, which Sars refers to *Lepidepecreum*, Sp. Bate, and *Orchomene Goësii*, n. s.; *Tryphosa*, n. g., with four species, of which only "*Tryphosa Höringii*" is new; *Normania*, a new genus to receive *Opis quadrimana*, Spence Bate et Westwood, 1868; *Opis*, Krøyer, afterwards altered to *Opisa*; *Acidostoma*, Lilljeborg. Of the new names, *Tryphosa* is inconveniently near to *Triphosa* among Lepidoptera.

Subfam. II. (by mistake printed III.), "Pontoporeinæ. Dana 1852," contains *Pontoporeia*, Krøyer, with the species *Pontoporeia femorata*, Kr., *Pontoporeia furcigera*, Bruzelius, according to Sars not distinct from *femorata*, and *Pontoporeia affinis*, Lindstrom; *Priscilla armata*, described here as a new genus and species, but in the later work accompanied by the synonym *Pontoporeia armata*, Boeck, 1860; *Argissa typica*, n. g. et s.; *Bathyporeia*,

Lindstrom, including *Thersites guilliamsoniana*, Sp. Bate, and *Thersites pelagica*, Sp. Bate, as synonyms, female and male respectively, of *Bathyporeia pilosa*, Lindstrom.

Subfam. III. "Stegocephalinæ, Dana 1852," contains *Stegocephalus*, Krøyer, with the species *Stegocephalus ampulla*, Phipps, and "*Stegocephalus Christianensis*," n. s.; *Andania*, n. g., with the new species, *Andania abyssi*, and *Andania nordlandica*.

Subfam. IV. Amphilochinæ, contains *Amphilochus*, Sp. Bate, including, besides the type species, *Amphilochus manuidens* (more correctly *manudens*), *Amphilochus odontonyx*, n. s., *Amphilochus bispinosa*, n. s., *Amphilochus tenuimanus*, n. s.; *Gitana*, n. g., with "*Gitana Sarsi*," n. s., and *Gitana rostrata*, n. s.; *Astyra abyssi*, n. g. et s.

Subfam. V. "Phoxinæ, Spence Bate 1857," embraces *Phoxus*, Krøyer, with the species *Phoxus holbølli*, Kr., and *Phoxus simplex*, Spence Bate, 1857, the latter in Sars' opinion being a wrong identification, so that he names Boeck's species *Phoxus falcatus* on account of the peculiar rostrum; *Harpina* (a preoccupied name afterwards changed to *Harpinia*), a new genus to receive *Phoxus plumosus*, Krøyer, and *Harpina crenulata*, n. s.; *Sulcator arenatius*, rather to be called *Haustorius arenarius*, Slabber; *Urothoë*, Dana.

Subfam. VI. Stenothoinæ, new, includes *Stenothoë*, Dana, Boeck's own *Stenothoë danai*, being here recognised as a synonym of *Montagua marina*, Sp. Bate, with the name *Stenothoë marina*; *Metopa*, a new genus to receive *Leucothoë clypeata* and *Leucothoë glacialis* of Kroyer, *Montagua alderii*, Sp. Bate, *Montagua bruzelii*, Goës (as to which, Sars, in 1882, points out that Boeck's species is distinct from that of Goës, and he therefore names it *Metopa borealis*), *Metopa affinis*, n. s., *Metopa longicornis*, n. s., *Metopa megacheir*, n. s., *Metopa longimana*, n. s., and *Metopa nasuta*, n. s.; *Cressa*, a new genus with the new species, "*Cressa Schiødtei*" and *Cressa minuta*. If the species *Schiødtei* be, as G. O. Sars considers it, a synonym of *Danaia dubia*, Spence Bate, the genus *Cressa* will become a synonym of *Danaia*, in which Boeck's species *minuta*, is very doubtfully distinct from its congener. The difficulty with regard to the mandibular palp has been already mentioned.

Subfam. VII. Syrrhoinæ, new, receives *Syrrhoë*, Goës, with the species *Syrrhoë crenulata*, Goës, and *Syrrhoë levis*, n. s.; *Tiron acanthurus*, Lilljeborg; *Bruzelia typica*, new genus and species.

Subfam. VIII. Pardaliscinæ, new, has *Pardalisca*, Krøyer, with the species *Pardalisca cuspidata*, Krøyer, *Pardalisca boeckii*, Malm, and *Pardalisca abyssi*, n. s.; the new genus *Halice*, with the new species *Halice abyssi* and *Halice granulicornis*, the latter, according to G. O. Sars, Ov. Norg. Crust. p. 106, being undoubtedly the male of the former; *Nicippe tumida*, Bruzelius.

Subfam. IX. "Leucothoinæ, Dana 1852," includes *Lilljeborgia pallida*, Sp. Bate, and *Lilljeborgia fissicornis*, M. Sars, the latter doubtfully distinct from the former; *Eusirus cuspidatus*, Kroyer, and *Eusirus longipes*, Boeck; *Leucothoë spinicarpa*, Abildgaard; the new genus *Tritropis* (a preoccupied name), for the species *aculeata*, Lepechin, "*Helleri*," n. s., and *fragilis*, Goës, of which the first two should perhaps be called *Rhachotropis aculeatus*, and the third *Rhachotropis fragilis*.

Subfam. X. "Oedicerinæ, Lilljeborg 1865," contains *Oediceros*, Krøyer, with the species *saginatus*, Kr., *lynceus*, M. Sars, *borealis*, n. s.; *Acanthostepheia*, a new genus to receive "*Amphithonotus Malmgreni*," Goës; *Monoculodes*, Stimpson, to receive the species *Oediceros affinis*, Bruzelius, *Oediceros norvegicus*, Boeck, "*Monoculodes Grubei*," n. s., *Monoculodes longicornis*, n. s., which in the opinion of J. S. Schneider is very near the preceding *Monoculodes grubei*, "*Monoculodes Krøyeri*," n. s., "*Monoculodes Packardi*," n. s., *Monoculodes tenuirostratus*, n. s., *Monoculodes tuberculatus*, n. s., *Monoculodes borealis*, n. s., both this and *Monoculodes norvegicus* in Boeck's later work receiving the same synonym, "*Oediceros affinis*, Goës, Crust. Amphip. maris Spetsb. p. 11. fig. 21 (non Bruzelius)," *Oediceros latimanus*, Goës; *Halimedon*, a new genus, with the species, "*Halimedon Mølleri*," n. s. (afterwards spelt Mülleri), "*Halimedon Saussurei*," n. s. (criticised by J. S. Schneider), *Halimedon longimanus*,

n. s., and *Halimedon brevicalcar*, altered from *Oediceros brevicalcar*, Goës; *Pontocrates* a new genus, with *Oediceros norvegicus*, Boeck, 1860, for the type, a species which was named *Krögera* (or *Krogera*) *arenaria*, by Sp. Bate, and Hancock, in 1858 (see Notes under that date); *Pontocrates haplocheles*, Grube, 1864; *Aceros*, Boeck, with the species *Aceros phyllonyx*, M. Sars; *Halicreion longicaudatus*, new genus and species; *Oediceropsis brevicornis*, Lilljeborg; *Paramphithoë*, Bruzelius, 1859, to receive the species *Amphithopsis glaber*, Boeck, *Paramphithoë media*, Goës, *Amphithoë panopla*, Kroyer, *Paramphithoë parva*, n. s., *Amphithoë pulchella*, Kroyer, *Amphithoë bicuspis*, Kroyer, all of which in the later work are transferred to *Pleustes*, Sp. Bate, 1858.

Subfam. XI. Iphimedinæ, new, contains *Vertumnus*, White, 1847, altered in the later work to *Acanthonotozoma*, here receiving the species *Acanthonotus cristatus*, Owen, *Oniscus serratus*, O. Fabricius, and *Acanthonotus inflatus*, Kroyer; *Iphimedia obesa*, Rathke; *Odius*, Lilljeborg, 1865, to receive *Otus carinatus*, Sp. Bate; *Luphystius sturionis*, Kroyer, the original spelling *Lafystius* being subsequently recognised.

Subfam. XII. Epimerinæ, new, has "*Acanthozone* n. g. (Acanthosoma, Owen)," for *Oniscus cuspidatus*, Lepechin; and *Epimeria*, Costa, for *Gammarus corniger*, Fabricius.

Subfam. XIII. Dexamininæ, new, receives *Dexamine spinosa*, Montagu, *Dexamine thea*, Boeck, "*Dexamine Heibergi*," n. s.; and *Lampra*, new genus, afterwards named *Tritaeta*, for the single species *Atylus gibbosus*, Sp. Bate.

Subfam. XIV. "Atylinæ. Lilljeborg 1866," has, in the genus *Atylus*, Leach, 1817, the species *Gammarus carinatus*, Fabr., *Paramphithoë smitti*, Goës, *Amphithoë swammerdamii*, M.-Edwards, *Dexamine vedlomensis*, Bate and Westwood, "*Atylus Nordlandicus*," n. s.; *Pontogeneia*, a new genus to receive *Amphithoë inermis*, Kroyer; *Haliragcs*, a new genus for *Dexamine bispinosus*, Sp. Bate, *Haliragcs borealis*, n. s., *Paramphithoë tridentata*, Bruz., *Amphithoë fulvocincta*, M. Sars; *Calliopius*, Lilljeborg, 1865, for *Amphithoë læviuscula*, Kroyer, and *Amphithoë norvegica*, Rathke; *Amphithopsis*, Boeck, 1860, with "*Amphithopsis Malmgreni*," n. s., *Amphithopsis longicaudata*, Boeck, *Amphithopsis longimana*, n. s., and *Amphithoë latipes*, M. Sars; *Cleippides*, a new genus for *Acanthonotus tricuspis*, Kroyer; "*Lucothoës Meinerti*," new genus and species.

Subfam. XV. "Gammarinæ. Dana 1849," contains *Gammarus*, Fabricius, 1776, with the species *locusta*, Linné, 1867, *marinus*, Leach, 1815, *pulex*, Pennant, 1777, and *neglectus* (Lilljeborg), G. O. Sars, 1867, in all of which the synonymy given demands attention; *Pallasia*, Spence Bate, 1862, in the later work spelt correctly *Pallasea*, with the single species *Pallasia quadrispinosa* (Esmark), G. O. Sars, 1867; *Maera*, Leach, for the species *Gammarus loréni*, Bruzelius, *Gammarus tordli*, Goës, and *Gammarus longimanus*, Thompson; *Melita*, Leach, for the species *obtusata* and *palmata* of Montagu, and for *Gammarus dentatus*, Kroyer; *Elasmopus*, Costa, 1856, for *Elasmopus latipes*, n. s.; *Cheirocratus*, Norman, 1865, for "*Gammarus Sundevalli*," Rathke, and *Gammarus assimilis*, Lilljeborg; *Gammaracanthus loricatus*, Sabine; *Niphargus*, Schiodte, 1851, for *Eriopis elongata*, Bruzelius; *Amathilla*, Bate and Westwood, for *Gammarus sabini*, Leach, *Gammarus angulosus*, Rathke, and *Gammarus pinguis*, Kroyer; *Melphidippa*, a new genus to receive *Gammaras spinosus*, Goës, and the new species *longipes* and *borealis*.

Subfam. XVI. "Ampeliscinæ. Spence Bate 1857," includes under *Ampelisca*, Kroyer, 1842, the species *tenuicornis*, Lilljeborg, *assimilis*, n. s., *typica*, Sp. Bate (according to G. O. Sars, Ov. Norg. Crust., p. 107, 1882, undoubtedly the male of *tenuicornis*), *æquicornis*, Bruzelius, *spinipes*, Boeck, *dubia*, n. s., *eschrichti*, Kroyer, *macrocephala*, Lilljeborg, *propinqua*, n. s., *lævigata*, Lilljeborg, a group of species which no doubt stands in need of some revision; under *Haploops*, Lilljeborg, 1855, *tubicola*, Lilljeborg, *carinata*, Lilljeborg, and *setosa*, n. s.; under *Byblis*, a new genus, the single species *Ampelisca gaimardi*, Kroyer, "1846?"

Subfam. XVI. Leptocheirinæ, new, contains *Leptocheirus pilosus*, Zaddach, and the new genus *Goësia*, for *Autonoë depressa*, Goës.

Subfam. XVII. Photinæ, new, said by a slip, which is repeated in the larger work, to have "Pedes 7mi paris breviores quam 6ti paris," receives *Photis reinhardi*, Krøyer, "*Photis Lütkeni*," n. s., which Norman identifies with the earlier *Eisladus longicaudatus*, Bate and Westwood, while Boeck makes *longicaudatus* a synonym of *Reinhardi*; *Microprotopus maculatus*, Norman; "*Xenocba Batei*," a new genus and species, which is so like the earlier *Nania rimapalma* of Spence Bate, that I do not think they should be kept distinct, although Boeck says that the apex of the telson in his species is cleft or sinuate. On the other hand the genus *Nænia*, 1862, must yield to *Podoceropsis*, 1860.

Subfam. XVIII. Microdeutopinæ, new, contains *Microdeutopus*, Costa, 1853, for the species *Microdeutopus gryllotalpa*, Costa, and *Gammarus anomalus*, Rathke; *Aora gracilis*, Sp. Bate; *Autonoë*, Bruzelius, 1859, for *Gammarus longipes*, Lilljeborg, and *Autonoë plumosa*, n. s.; *Protomedeia fasciata*, Krøyer, and *Protomedeia longimana*, n. s.; *Gammaropsis erythrophthalmus*, Lilljeborg, the species described by Boeck being, according to G. O. Sars, Ov. Norg. Crust., p. 111, quite distinct from Lilljeborg's, on which account he renames it *Gammaropsis melanops*, although it must be observed that in this work the eyes are said to be "rubri," an expression omitted from the later work, where no colour for the eyes is mentioned; *Podoceropsis sophiæ*, Boeck.

Subfam. XIX. Amphithoinæ, new, contains *Amphithoë podoceroides*, Rathke, *Amphithoë grandimana*, Boeck; *Sunamphithoë hamulus*, Sp. Bate, *Sunamphithoë longicornis*, n. s.

Subfam. XX. Podocerinæ, new, includes *Podocerus*, Leach, to receive *Ischyrocerus latipes*, Krøyer, *Podocerus megarhein*, n. s., *Ischyrocerus anguipes*, Krøyer, *Cancer* (*Gammarus*) *falcatus*, Montagu; *Janassa*, a new genus for *Podocerus variegatus*, Leach, which is probably only a form of *Podocerus falcatus*, while the name *Janassa* is preoccupied among fossil fish; *Cerapus*, Say, 1817, to receive *Cerapus abditus*, Templeton, *Cerapus difformis*, Milne-Edwards, *Cerapus longimanus*, n. s., and *Cerapus hunteri*, Sp. Bate, the last three of which S. I. Smith places in the genus *Erichthonius*, Milne-Edwards, making the species *hunteri* synonymous with *difformis*.

Subfam. XXI. "Chelurinæ. Allman 1837," has only *Chelura terebrans*, Philippi.

Subfam. XXII. "Corophinæ. Dana 1849," contains *Corophium*, Latreille, 1807, to receive *Cancer grossipes*, Linné, *Corophium crassicorne*, Bruzelius, 1859, with "? Corophium acherusicum, Costa," 1856, and "? Corophium crassicorne (Bruzelius), Spence Bate and Westwood," 1863, given in the synonymy, *Corophium affine*, Bruzelius, with "? Corophium Bonellii, Milne-Edwards," ♀, 1830, in the synonymy, this last being, according to G. O. Sars, Ov. Norg. Crust., p. 112, distinct from *Corophium crassicorne*, Bruzelius, to which Boeck in his later work doubtfully makes it a synonym, withdrawing it from *Corophium affine*; *Siphonœcetus*, afterwards corrected to *Siphonœcetes*, Krøyer, 1845, to receive *Siphonœcetes typicus*, Krøyer, "*Siphonœcetes Colletti*," n. s.; *Glauconome*, Krøyer, 1845, a preoccupied name, which must yield, as pointed out by S. I. Smith, to *Unciola*, Say, but here used for the three species, *leucopis*, Krøyer, which Smith identifies with *Unciola irrorata*, Say, "*Krøyeri*," n. s., and "*Steenstrupi*," n. s.; and lastly *Hela* (now *Neohela*) *monstrosa*, Boeck.

Fam. IV. "Dulichidæ. Dana 1849," comprises *Dulichia*, Krøyer, 1845, with six species, *spinosissima*, Krøyer, *falcata*, Sp. Bate, "*Nordlandica*," n. s., *tuberculata*, n. s., *curticaula*, n. s., *porrecta*, Sp. Bate; *Paradulichia typica*, new genus and species; *Lætmatophilus*, Bruzelius, 1859, with the species *tuberculatus*, Bruzelius, and *spinosissimus*, n. s.; "*Xenodice Frauenfeldti*," new genus and species.

Fam. V. "Caprellidæ. Leach 1815," has two subfamilies:—

Subfam I. Caprellinæ, new, contains *Proto goodsirii*, Sp. Bate, which is now made a synonym of the following species, *Proto ventricosa*, Müller; *Cercops holbølli*, Krøyer; *Ægina*, Krøyer,

1843, for the species *Æginа longicornis*, Krøyer, *Cancer phasma*, Montagu, which properly belongs to *Protella*, Dana, *Æginа echinata*, Boeck, and *Æginа lævis*, Boeck, which Mayer unites to *Æginа longicornis*, Krøyer; *Æginella spinosa*, Boeck; *Caprella*, Lamarck, 1818, with the species *linearis*, Linné, *laticornis*, Boeck, *longicornis*, n. s., *esmarkii*, Boeck, "*Loréni*," n. s., *septentrionalis*, Krøyer, *punctata*, Boeck, *hystrix*, Krøyer, of which Mayer makes *laticornis* and *esmarkii* synonyms of *Caprella æquilibra*, Say, and queries whether *longicornis*, *loréni* and *punctata* be not synonyms of *Caprella septentrionalis*, Krøyer; *Podalirius typicus*, Krøyer.

Subfam. II. "Cyaminæ. Krøyer 1843," in a "Conspectus Cyamidarum borealium hujusque [hucusque] cognitarum. Auctore Chr. Lütken," contains *Platycyamus*, Ltk., new genus for *Cyamus thompsoni*, Gosse; and *Cyamus*, Latreille.

The latter genus has the species "*Cyamus Mysticeti* Ltk.," with the "Synonymia: *Oniscus ceti* Pall., *Squilla Balæni* de Geer, *Cyamus ceti* Auct. plerumqve. (*Oniscus ceti* Linn. indeterminabilis?);" "*Cyamus Monodontis* Ltk.;" "*Cyamus Boopis* Ltk.," with "Syn. *Oniscus ceti* Fabr. Faun. Groul. 330."; *Cyamus nodosus*, Ltk., with "Syn. *Oniscus ceti* Zool. Dan. iii. tab. cxix. f. 13–17."; "*Cyamus Globicipitis* Ltk.," with "Syn. *Cyamus sp. n.* Stp." It may be, and has been questioned, whether Lütken is justified in superseding the old name *Cyamus ceti* for the species parasitic on the Greenland whale.

The new genera are described as follows:—

Div. I. Fam. I. Hyperidæ. Gen. III. *Parathemisto*. "Corpus sat compressum; dorso carinato. Mandibulæ in apice perlatæ, serratæ, æqve ut mala interna; tuberculo molari latissimo, in margine crenato; palpo longissimo. Maxillæ 1mi paris dentibus qvatuor perlongis et firmis armatæ. Pedes 2di paris (non pedis 1mi paris) carpo in angulo inferiore posteriore valde producto; manu cheliformi. Pedes 3tii 4tiqve paris articulo 4to subdilatato. Pedes trium parium ultimorum subæqvales."

Fam. II. Tryphanidæ. Gen. I. *Tryphana*. "Truncus segmentis septem perangustis. Post-abdomen segmentis tribus anterioribus perlatis. Caput permagnum antice obtusum. Pedes 1mi 2diqve paris sat parvi; articulo 5to non subcheliformi. Pedes 3tii et 4ti paris magnitudine et forma æqvales. Pedes trium parium ultimorum gradatim magnitudine valde decrescentes; pedes 5ti paris pedibus 7mi paris plus duplo majores."

Div. II. Fam. III. Gammaridæ. Subfam. I. Lysianassinæ. Gen. II. *Ambasia*. "Hypostomum valde gibbosum, prominens. Mandibulæ palpo elongato et tenui, profundius qvam tuberculo molari parvo affixo. Maxillæ 1mi paris lamina interiore minima, ovata. Maxillæ 2di paris breves, non lati. Pedes maxillares laminis exterioribus permagnis, ovatis, vix in margine interiore nodulosis; palpo brevi; articulo 4to tuberculiformi. Antennæ inferiores articulo 3tio prælongato. Pedes 1mi paris graciles, manu subcheliformi destituti. Pedes saltatorii ultimi paris breves; ramo interiore multo breviore quam exteriore. Appendix caudalis brevis, fissa."

Gen. IV. *Socarnes*. "Labium superius prælongatum, prominens, acerrimum, cum hypostomi apice acuto conjunctum. Mandibulæ mediocriter elongatæ; palpo multo profundius qvam tuberculo molari prominenti affixo. Maxillæ 1mi paris dentibus perlatis; lamina interiore prælongata, angusta et in apice duobus setis plumosis instructa. Maxillæ 2di paris laminis angustis, elongatis. Pedes maxillares laminis exterioribus ovatis, in margine interno nodulos parvulos gerentibus; lamina interiore prælongata; articulo palpi 2do elongato; articulo 4to ungviformi. Antennæ breves. Pedes 1mi paris breves; manu apicem versus attenuata et haud subcheliformi. Appendix caudalis longitudine mediocri, usqve ad medium fissa."

Gen. VI. *Hippomedon*. Mandibulæ breves; mala exteriore angusta; in sinistra dente parvulo accessorio instructæ; palpo in eadem altitudine ac tuberculo molari permagno affixo. Maxillæ 1mi paris palpo in apice multis, brevibus, latis, parum serratis dentibus instructo; lamina interiore sat brevi, in apice duabus setis plumosis instructa. Maxillæ 2di paris

laminis brevibus. Pedes maxillares breves, lati; lamina exteriore ultra articulum palpi 2dum porrecta, in margine interno dentibus crebris, validis armata; lamina interiore brevi. Antennæ elongatæ; antennæ inferiores articulo 5to multo longiore qvam 4to. Pedes 1mi paris sat elongati; imprimis articulus 4tus; manu invalida, subcheliformi. Appendix caudalis elongata, profunde fissa, ultra pedunculum pedium saltatoriorum paris ultimi porrecta."

Gen. VII. *Cyphocaris*, Lütken, n. g. "Mandibulæ brevissimæ; palpo longo et latissimo, in eadem altitudine ac tuberculo molari robusto affixo. Maxillæ 1mi paris palpo apicem versus dentibus paucis sed validis et una seta prælongata plumosa armato; lamina interiore elongata, et in margine interno setis multis plumosis instructa. Pedes maxillares lamina exteriore brevissima, in margine interno dentibus paucis sed validis armata; palpo prælongato; articulo 1mo et 2do eadem longitudine; articulo 4to cylindrico, non ungviformi, seta robusta plumosa instructo. Antennæ inferiores articulo 1mo ab integumentis capitis non tecto, sed extus visibili, in incisura eorundem sito. Pedes 1mi paris parvi; manu apicem versus acuta, vix subcheliformi. Pedes 2di paris elongati, ungve destituti. Appendix caudalis profunde fissa, longe ultra articulum basalem pedium saltatoriorum paris ultimi porrecta. Segmentum trunci 1mum valde gibbosum; caput sub anulo situm, ex parte tectum; epimerum 1mum nullum, 2dum parvulum; 3tium et 4tum coalita, magna."

Gen. IX. *Aristias*. "Mandibulæ elongatæ, angustæ, in apice vero latæ, sine dente accessorio; tuberculo molari prominenti, acuto, palpo in eadem altitudine infixo. Maxillæ 1mi paris perlatæ; in margine crebras setas plumosas gerentes; lamina interiore etiam brevi, ovata, in apice crebris setis plumosis instructa; at palpo angusto, in apice paucis spinis instructo. Maxillæ 2di paris item laminis latissimis, in margine setis multis instructis; lamina exteriore angustiore qvam interiore. Pedes maxillares lamina exteriore permagna, in margine setis paucis modo armata et ferme ad finem articuli palpi 3tii porrecta; articulo palpi 3tio brevi et gracili; 4to ungviformi; lamina interiore brevisaima, triangulari, ad basin lata, et in apice uno dente et setis pluribus plumosis armata. Antennæ superiores pedunculo elongato, angusto. Pedes 1mi paris manu apicem versus angustiore. Pedes 2di paris elongati; manu sat angusta. Pedes saltatorii paris ultimi ramo interiore paulo breviore qvam exteriore; ramo interiore in margine externo et interno serrulato, exteriore in margine interno modo. Appendix caudalis brevissima, non ad finem pedunculi pedum saltatoriorum ultimi paris porrecta, usqve ad basin fissa."

Gen. XI. *Onisimus*. "Hypostomum prominens. Mandibulæ palpo in eadem altitudine ac tuberculo molari mediocri affixo; in apice dente firmo et dente accessorio angusto instructæ. Labium inferius laciniis in apice spina una armatis. Maxillæ 1mi paris lamina interiore parva, ovata, in apice setas duas plumosas gerenti; palpo in apice 5–6 spinis instructo. Maxillæ 2di paris laminis brevissimis; exteriore duplo fere longiore qvam interiore. Pedes maxillares laminis exterioribus parvis, non ad finem articuli palpi 2di porrectis; in margine interno nodis paucis et in apice dente una instructis. Epimera qvatuor anteriora angusta; epimerum 4tum subcurvatum. Angulus inferior posticus segmenti postabdominis 3tii acutus. Antennæ plus minusve prælongatæ. Antennæ inferiores articulo 5to breviore qvam 4to. Pedes 1mi paris brevissimi, robusti; manu qvadrangulari, in acie obliqve truncata. Pedes saltatorii ultimi paris ramis brevibus. Appendix caudalis sat brevis, non ad finem pedunculi pedum saltatoriorum ultimi paris porrecta."

Gen. XII. *Menigrates*. "Mandibulæ brevissimæ; palpo brevi, profundius qvam tuberculo molari robusto affixo. Maxillæ 1mi paris lamina interiore ovata, in apice setis duabus plumosis instructa; palpo in apice paucas spinas gerenti. Maxillæ 2di paris laminis mediocriter elongatis. Pedes maxillares latissimi, breves; lamina exteriore ultra finem articuli palpi 2di porrecta, paucis spinis gracilibus et nodis et in apice spina una valida armata; articulis palpi brevissimis et latis; articulo 4to processum brevem, obtusum, tuberculiformem

formanti. Corpus peraltum et crassum. Antennæ sat breves. Pedes 1mi paris robustissimi; manu vix subcheliformi. Pedes saltatorii brevissimi et crassi."

Gen. XIII. *Orchomene.* "Hypostomum prominens, cassiforme. Mandibulæ longæ, angustæ; palpo profundius qvam tuberculo molari prominenti affixo. Maxillæ 1mi paris lamina interiore prælongata, angusta, infra in apice setas duas plumosas gerenti; palpo in apice dentibus multis, minutis instructo. Maxillæ 2di paris laminis perlongis et perangustis; exteriore paulo longiore et angustiore qvam interiore. Pedes maxillares lamina exteriore ultra finem articuli palpi 2di porrecta; articulo palpi 1mo magno. Corpus sat altum. Epimerum 5tum altius qvam latius. Angulus inferior posticus lateralis segmenti post-abdominis 3tii non sursum productus et curvatus. Antennæ inferiores articulo pedunculi 3tio prælongato, angusto. Pedes 1mi paris brevissimi, robusti; manu qvadrangulari, longitudinem carpi triangularis superanti. Pedes 2di paris manu in angulo inferiore postice producta. Appendix caudalis brevissima, in apice parum fissa, non ad finem pedunculi pedum saltatoriorum ultimorum porrecta."

Gen. XIV. *Tryphosa.* "Hypostomum plus minusve prominens. Mandibulæ palpo gracili fere in eadem altitudine ac tuberculo molari affixo; articulo palpi 3tio brevi. Maxillæ 1mi paris lamina interiore ovata, in apice setas duas plumosas gerenti; palpo in apice dentibus nonnullis obtusis instructo. Maxillæ 2di paris laminis haud valde prælongatis. Pedes maxillares lamina exteriore lata, ovata, in margine interiore nodis multis, in apice spinis duobus armata, ultra finem articuli palpi 2di porrecta. Pedes 1mi paris elongati. Appendix caudalis prælongata, ultra finem articuli ultimi pedum saltatoriorum porrecta."

Genus XV. *Normania.* "Mandibulæ palpo gracillimo, elongato. Maxillæ 1mi paris palpo latissimo, ovato; lamina interiore angusta, non vero prælongata, setas duas plumosas gerenti. Maxillæ 2di paris laminis angustis, non vero longis. Pedes maxillares lamina exteriore latissima, in margine spinis paucis gracilibus instructa; lamina interiore prælongata, angusta; palpo multo breviore qvam lamina exteriore, triarticulato; articulo palpi 4to absenti. Antennæ superiores breves, non crassi. Antennæ inferiores breves; segmento pedunculi 1mo inflato et extus visibili. Pedes 1mi paris manu magnopere inflata, lata, valde subcheliformi. Pedes 2di paris elongati. Pedes saltatorii elongati. Appendix caudalis perbrevis, lata, non fissa."

Subfam. II. Pontoporeinæ. Gen. II. *Priscilla.* "Epimera anteriora qvatuor rigida, longa, attenuata, in apice setis longis plumosis instructa. Pedes 1mi et 2di paris inter se eadem fere forma; manu parva, subcheliformi instructi. Pedes 3tii et 4ti paris robusti; articulo ultimo serie setarum validarum instructo. Pedes 5ti et 6ti paris articulo 1mo perrigido, parum dilatato, in angulo superiore producto. Pedes 7mi paris articulo 1mo valido, clipeoformi, dilatato; articulo 5to in apice spinis multis, rigidis armato. Pedes saltatorii ultimi paris ramo interiore parvulo. Appendix caudalis latissima, insinuata modo, non fissa."

Gen. III. *Argissa.*" Antennæ superiores inferioribus multo breviores. Epimerum 1mum magnum, in margine inferiore rotundatum. Epimera cætera magnitudine valde decrescentia; epimerum 3tium parvulum, sed 4tum pergrande, clipeoforme. Pedes 1mi et 2di paris inter se eadem forma, sed infirmi; manu subcheliformi. Pedes 3tii et 4ti paris ungve minimo. Pedes 5ti et 6ti paris articulo 1mo postice sat dilatato; ungvibus parvulis. Pedes 7mi paris articulo 1mo pergrandi, clipeoformi; ungve parvo. Pedes saltatorii ultimi paris ramis universis inter se fere eadem longitudine. Appendix caudalis elongata, usqve ad basin fissa."

Subfam. III. Stegocephalinæ. Gen. II. *Audania.* "Mandibulæ in apice non aut minime modo dentatæ; mala interiore mandibulæ sinistræ item minima. Maxillæ 1mi paris palpo elongato, lato, 2articulato. Maxillæ 2di paris lamina exteriore multo breviore qvam interiore et parum modo angustiore qvam longa. Appendix caudalis integra, minima."

Subfam. IV. Amphilochinæ. Gen. II. *Gitana*. "Mandibulæ articulo palpi 3tio breviore qvam 2do. Maxillæ 1mi paris palpo uniarticulato, in apice angusto. Pedes 1mi et 2di paris manibus angustis, vix subcheliformibus. Pedes maxillares palpis perangustis, elongatis; articulo 3tio in extremo margine interiore producto."

Gen. III. *Astyra*. "Mandibulæ in apice dilatatæ et dentatæ; tuberculo molari prominenti sed tenui, apicem versus angustiore; articulo 3tio palpi breviore qvam 2do. Maxillæ 1mi paris lamina interna latiore, setis multis instructa. Maxillæ 2di paris lamina interna perbrevi sed lata. Pedes maxillares lamina externa permagna, in margine interiore dentibus multis armata; palpo brevi. Antennæ breves; superiores inferioribus breviores; flagello accessorio parvo; pedunculo brevi, sed crasso. Pedes 1mi et 2di paris vix subcheliformes. Pedes trium parium ultimorum articulo 1mo non perdilatato. Pedes saltatorii ultimi paris ramo interiore breviore qvam exteriore. Appendix caudalis brevis, in apice incisa."

Subfam. V. Phoxinæ. Gen. II. *Harpina*. "Maxillæ 1mi paris palpo 2articulato. Pedes 5ti paris articulo 1mo non dilatato. Cæteroqvin ferme ut apud genus Phoxus."

Subfam. VI. Stenothoinæ. Gen. II. *Metopa*. "Mandibulæ palpo brevi, 3articulato; articulo 3tio fere obsoleto. Maxillæ 1mi paris palpo 1articulato. Reliqva cum genere Stenothoë ferme conveniunt."

Gen. III. *Cressa*. "Mandibulæ palpo elongato, 3articulato. Antennæ superiores inferioribus multo crassiores et longiores. Epimera non permagna; 4tum in supremo margine postico profunde incisum. Pedes trium parium ultimorum articulo 1mo postice valde dilatato. Reliqva cum genere Stenothoë ferme conveniunt."

Subfam. III. Syrrhoinæ. Gen. III. *Bruzelia*. "Mandibulæ crassissimæ, latæ, pyramidales, in apice insinuatæ, non dentatæ. Maxillæ 1mi paris palpo angusto. Corpus subdepressum; epimeris perrigidis, prominentibus, magnitudinis mediocris; epimero 4to maximo. Pedes 1mi et 2di paris manu parva, subcheliformi. Pedes 3tii et 4ti paris perangusti, elongati; articulo 3tio perbrevi. Pedes trium parium ultimorum elongati; articulo 1mo parum dilatato. Pedes saltatorii 1mi paris ramo exteriore breviore qvam interiore; 2di paris ramo interiore latissimo, exteriore parvo. Appendix caudalis longa, non fissa."

Subfam. VIII. Pardaliscinæ. Gen. II. *Halice*. "Instrumenta cibaria æqve ut apud genus Pardalisca. Caput parvum, non inflatum; rostrum frontale elongatum. Antennæ inferiores pedunculo prælongato, angusto. Pedes 1mi et 2di paris carpo angusto; manu elongata; ungve graeili. Pedes trium parium ultimorum sat prælongati."

Subfam. IX. Leucothoinæ. Gen. IV. *Tritropis*. Antennæ superiores inferioribus breviores. Epimera parva; 1mum in angulo inferiore antico productum. Pedes 1mi et 2di paris manu sat magna, ovata; ungve longo; carpo brevi, in angulo inferiore postico producto. Pedes 3tii et 4ti paris perlongi, graciles; articulo 3tio brevi. Pedes trium parium ultimorum gracillimi et longissimi; articulo 1mo dilatato. Appendix caudalis prælongata, in apice fissa."

Subfam. X. Oedicerinæ. Gen. II. *Acanthostepheia*. "Pedes maxillares lamina externa parvula, non ad medium articulum palpi 2dum porrecta; lamina interna etiam parvula. Antennæ prælongatæ, tenues; superiores inferioribus paulo breviores. Corpus valde carinatum; segmentis trunci posterioribus et segmentis postabdominis postice in processus longos et dentiformes exeuntibus; epimeris posterioribus valde acuminatis; capite antice in rostrum longissimum producto. Cæteroqvin ferme ut apud genus Œdiceros."

Gen. IV. *Halimedon*. "Mandibulæ in apice parum modo dentatæ et crassæ; palpo prælongato et angusto. Pedes 1mi paris carpo tam longo aut multo longiore qvam manu ovata et in angulo inferiore postico parum dilatato. Pedes 2di paris carpo prælongato, angusto, calce parvula prædito aut destituto; manu tam longa aut breviore qvam carpo."

Gen. V. *Pontocrates*. "Pedes 1mi paris pervalidi; manu magna, lata; calce carpi eadem longitudine ac margine manus posteriore. Pedes 2di paris manu prælongata, cheliformi; calce carpi prælongata aut absenti. Cæteroqvin ferme ut apud Œdiceros."

Gen. VII. *Halicreion.* "Pedes maxillares lamina utraqve minima; palpo prælongato. Antennæ elongatæ; superiores articulis pedunculi longitudine parum modo decrescentibus et apud marem minimis; articulis flagelli anterioribus maris coalitis. Pedes 7mi paris pedibus 5ti et 6ti paris paulo, non multo, longiores. Pedes saltatorii 1mi et 2di paris postice ad apicem pedunculi ultimi paris porrecti. Pedes saltatorii ultimi paris prælongati. Cæteroqvin ferme ut apud genus Ediceros."

Subfam. XII. Epimerinæ. Gen. I. *Acanthozone.* "Segmenta trunci et postabdominis seriebus pluribus dentium armata. Epimera qvatuor anteriora non permagna sed rigida, in apice acuminata. Pedes trium parium ultimorum articulo 1mo valde dilatato et spinis armato. Pedes saltatorii ultimi paris ramis lanceolatis."

Subfam. XIII. Dexamininæ. Gen. II. *Lampra.* "Pedes maxillares laminis exterioribus angustioribus, valde curvatis et modo in summo dimidio spinis paucis sed validis armatis; laminis interioribus latioribus et longioribus qvam apud genus Dexamine, spinis multis curvatis et gracilibus armatis. Epimera minima; epimera qvatuor anteriora 5to non altiora, in margine inferiore armata. Pedes qvinqve parium ultimorum articulo 4to et 5to perbrevibus; ungve parvo."

Subfam. XIV. Atylinæ. Gen. II. *Pontogeneia.* "Mandibulæ palpo valido; articulo 3tio multo breviore qvam 2do. Maxillæ 1mi paris lamina interna paucis (3–6) setis plumosis instructa. Pedes maxillares lamina externa et interna spinis (non dentibus) elongatis instructis; palpo brevi; articulo ejusdem 3tio in fine marginis exterioris producto. Antennæ superiores inferioribus paulo longiores. Pedes saltatorii 1mi et 2di paris ramis exterioribus brevioribus qvam interioribus. Pedes saltatorii 3tii paris pedunculo perbrevi, breviore qvam appendice caudali. Appendix caudalis duplex. Corpus leve, non carinatum; epimeris parvis; epimera 4to altiore qvam 5to."

Gen. III. *Halirages.* Mandibulæ palpo elongato; articulo 3tio breviore qvam 2do. Maxillæ 1mi paris lamina interiore ovata, in margine interiore setis paucis plumosis (3–6) instructa. Pedes maxillares lamina exteriore magnitudinis mediocris, non ad finem articuli palpi 2di porrecta et in margine interiore spinis tenuibus armata. Corpus non valde compressum; dorso rotundato, non carinato; segmentis trunci ultimis et postabdominis anterioribus plerumqve in medio margine posteriore in dentes retroversos desinentibus; epimeris magnitudinis mediocris vel parvis. Antennæ pedunculis brevibus sed flagellis prælongatis, multiarticulatis; superiores inferioribus multo breviores. Pedes 1mi et 2di paris elongati, angusti; manibus parvis. Pedes saltatorii 1mi 2diqve paris ramis exterioribus brevioribus qvam interioribus; pedes saltatorii ultimi paris pedunculo longiore qvam appendice caudali. Appendix caudalis parva et integra."

Gen. VI. *Cleippides.* "Mandibulæ articulo palpi 3tio perlato et brevi. Maxillæ 1mi paris lamina interiore elongata, in margine interiore setis multis plumosis instructa. Pedes maxillares lamina exteriore spinis elongatis plumosis armata; palpis brevibus, latis. Epimera qvatuor anteriora parva. Antennæ flagellis elongatis, multiarticulatis; superiores inferioribus longiores. Pedes 1mi et 2di paris manu parva. Pedes trium parium ultimorum articulo 1mo non multo dilatato. Pedes saltatorii ultimi paris pedunculo elongato. Appendix caudalis integra."

Gen. VII. *Laothoës.* "Mandibulæ articulo palpi 3tio perlato, dimidiam longitudinem articuli 2di ferme æqvanti. Maxillæ 1mi paris lamina interna parva, ovali, in margine setis plumosis paucis instructa; palpo uniarticulato, parvo. Maxillæ 2di paris laminis angustis. Pedes maxillares lamina interna longitudinis mediocris, in apice dentibus tribus armata; lamina externa permagna, in margine interiore dentibus multis, parvis sed firmis, apicem versus paulo majoribus, armata; palpo parvo, parum modo longiore qvam lamina externa; articulo palpi ultimo ungviformi. Corpus elongatum, angustum, non carinatum; capite inflato; epimeris parvis; epimero 4to altiore sed breviore qvam 5to. Antennæ pedunculis brevibus;

flagellis prælongatis, multiarticulatis; superiores inferioribus longiores. Pedes 1mi 2diqve paris graciles, longitudine et forma fere æqvales. Appendix caudalis integra."

Subfam. XV. Gammarinæ. Gen. X. *Melphidippa*. "Mandibulæ palpo brevi atqve perangusto; articulo palpi 3tio breviore qvam 2do. Maxillæ 1mi paris lamina interiore sat lata, non vero longa, in margine interiore setis compluribus plumosis instructa. Pedes maxillares palpis angustis, elongatis; lamina exteriore brevi, lata, in margine interiore dentibus paucis, parvis armata. Corpus elongatum, maxime postabdomen. Segmenta postabdominis in margine posteriore dentibus majoribus aut minoribus armata. Epimera sat parvula. Antennæ elongatæ, graciles; superiores et inferiores longitudine fere æqvales. Pedes angusti, elongati; pedes 1mi et 2di paris manu subcheliformi, parva; pedes trium parium ultimorum articulo 1mo parum modo dilatato. Pedes saltatorii ultimi paris ultra finem eorundem 1mi et 2di paris longe producti. Appendix caudalis elongata, plus minusve fissa."

Subfam. XVI. Ampeliscinæ. Gen. III. *Byblis*. "Oculi qvatuor. Mandibulæ articulo palpi 3tio multo breviore qvam articulo 2do angusto. Pedes maxillares articulo palpi 3tio vix dilatato. Epimera minora qvam apud genera præcedentia [Ampelisca and Haploops]. Antennæ inferiores articulo pedunculi 1mo et 2do extus visibilibus, in incisura capitis sitis. Pedes 7mi paris articulo 1mo deorsum et postice perdilatato; articulo 3tio brevi; articulo 4to et 5to elongatis. Pedes saltatorii ultimi paris perbreves. Appendix caudalis brevis, lata, parum fissa."

Subfam. XVII. Leptocheirinæ. Gen. II. *Goësia*. "Corpus subdepressum; epimeris non altis; epimero 2do minore qvam apud genus Leptocheirus. Antennæ superiores flagello accessorio fere obsoleto. Pedes 2di paris iisdem 1mi paris validiores, sed non multo longiores, in margine anteriore setis longis plumosis instructi; manu magna, subcheliformi; carpo non prælongato. Cæteroqvin ferme ut apud genus Leptocheirus."

Subfam. XVIII. Photinæ. Gen. III. *Xenocheira*. "Antennæ superiores articulo pedunculi 3tio elongato; flagello accessorio absenti. Pedes 1mi paris carpo elongato. Pedes 3tii et 4ti paris articulo 1mo latissimo. Pedes saltatorii ultimi paris biramei; ramis invicem longitudine fere æqvalibus. Appendix caudalis in apice insinuata."

Subfam. XXI. Podocerinæ. Gen. II. *Janassa*. "Mandibulæ palpo perlato, non vero longo; articulo palpi 3tio obovato. Antennæ robustæ, setis densis instructæ; superiores flagello perbrevi, ex articulis paucis (3) constanti; articulo ejusdem 1mo perlongo; flagello accessorio fere obsoleto. Antennæ inferiores superioribus multo longiores et crassiores; flagello ex articulis paucis constanti; articulo ejusdem 1mo permagno, prælongato. Corpus subdepressum; epimeris parvis. Reliqva cum genere Podocerus ferme conveniunt."

Fam. IV. Dulichidæ. Gen. II. *Paradulichia*. "Antennæ multo breviores qvam apud genus Dulichia. Pedes saltatorii ultimi paris 1ramosi; ramo minimo. Reliqva cum genere præcedenti conveniunt."

Gen. IV. *Xenodice*. "Pedes maxillares 2di paris lamina interiore magnitudinis mediocris, in margine interiore setis pluribus (7) instructa. Antennæ superiores et inferiores longitudine fere æqvales; flagellis multiarticulatis sed multo brevioribus qvam pedunculo. Antennæ superiores flagello accessorio instructæ. Pedes 1mi 2diqve paris magnitudine et forma fere æqvales; manu parva, subcheliformi. Pedes 3tii et 4ti paris ejusdem magnitudinis, elongati. Pedes trium parium posteriorum longitudine gradatim crescentes, filiformes. Pedes saltatorii 1mi 2diqve paris elongati, biramei."

Fam. V. Caprellidæ. Subfam. II. Cyaminæ. Gen. I. *Platycyamus* (Lütken), "distinguitur a *Cyamis* propriis annulo primo corporis a capite sejuncto, pedibusqve primi paris pedes secundi paris fere æqvantibus hisceque antepositis."

It may be proper to observe that the generic characters above quoted are more or less dependent

on the characters of the families and subfamilies, which Boeck describes at great length. Occasionally there are discrepancies between the one set of characters and the other, which is excusable in so comprehensive a work. For instance, the character of *Platycyamus* does not suit the words "segmento trunci 1mo cum capite coalito" included in the definition of the family Caprellidæ. Several of the subfamilies have been by some accident wrongly numbered in the original.

1870. Brady, George Stewardson.

On the Crustacean Fauna of the Salt-marshes of Northumberland and Durham. Nat. Hist. Trans. of Northumberland and Durham, Vol. III., pp. 120–136. Pl. IV. V. London, 1870.

Mr. Brady says, "The higher orders of Crustacea are almost always represented in salt-marsh pools by *Carcinus mænas*, *Palæmon varians*, *Crangon vulgaris*, *Mysis vulgaris*, *Gammarus locusta*, *Corophium longicorne*, and *Sphæroma rugicauda;* in Hylton Dene I met also with *Orchestia littorea*, and at Seaton Sluice with *Oniscus asellus*." In the "debateable ground" between fresh and brackish water at Hylton Dene he found *Corophium longicorne* along with *Palæmon varians* and *Mysis vulgaris*.

1870. Dohrn, Anton.

Die Ueberreste des Zoea-Stadiums in der ontogenetischen Entwickelung der verschiedenen Crustaceen-Familien. Jenaische Zeitschrift fur Medicin und Naturwissenschaften. Bd. V. pp. 471–491.

"He regards the dorsal spine as a very essential character of *Zoea*, and thinks that the dorsal accumulations of cells in the embryos of some Isopods and Amphipods, the so-called micropyle-apparatus in the Amphipods, the dorsal sucker of the larvæ of *Limnadia* and the *Cladocera*, the frontal fixing apparatus of *Caligus* and *Chalimus*, and the peduncle of the Cirripeds are to be regarded as transformations of the dorsal spine of *Zoea*" (Dr. von Martens in Zoological Record for 1870).

1870. Iarzynsky, Th.

Praemissus catalogus Crustaceorum amphipodum, inventorum in mari albo et in mari glaciali ad litus murmanicum anno 1869 et 1870. S. Petersburg, L. Universität. Zool. Museum. Tome i. Pt. ii. pp. 315–316. St. Petersburg, 1870.

In all, fifty-two species are named in this catalogue, but, as usual in such lists, some deduction must be made from the total, on the score of synonyms entered as separate species. Notice is given, without any description, of *Montagua variegata*, n. sp., "*Lysianassa Göesi*," n. sp., "*Ampelisca Koreni*," n. sp., "*Oediceros Brandtii*," n. sp., *Uruios*, n. gen., *Uruios viridis*, n. sp., with the remarks "similis Gammaro longicaudæ Brandt (mari Ochotico). Hab. mari glaciali ad litus murmanicum (ad insulas Gavrilienses)," and "*Dulichia Malmgreni*," n. sp.

It is not easy to see what object is served by publishing names of undescribed species and genera, which neither convey any information of importance, nor can reasonably establish any claim to priority of discovery.

1870. Malm, August Wilhelm, born 1821, died March 4, 1882 (Hj. Théel).

Om två för vetenskapen nya Amfipod-species från Bohuslän, af hvilka det ena är typ för ett nytt genus inom Pontoporeinernas grupp. Öfversigt af Kongl. Vetenskaps Förhandlingar, 1870. No: 6. Stockholm. pp. 543–548. Tafl. v.

This short paper describes a new genus, *Boeckia*, which is said to come close to *Pontoporeia*, Krüyer; *Boeckia typica*, n. sp., in which the second gnathopod has a very long wrist and a very short hand, with the side-plate covering that of the first gnathopod and exceeding in size each of those that follow it. There is further a description of "*Pardalisca Boeckii*," n. sp., and figures of both species.

The new genus *Boeckia* is thus described:—"Epimera primi paris ab iis secundi paris occulta, hæc omnium maxima. Carpus pedum secundi paris valde elongatus; manus perbrevis, vix prehensilis. Pedes quinti, sexti, septimi paris longitudine sensim accrescentes; articulus primus paris septimi parum dilatatus. Pedes saltatorii perbreves, aculeis validis armati. Appendix caudalis perbrevis, postice leviter emarginata, non vero fissa. Lamina interior maxillæ primi paris elongata, perparum lata, extremitate setis nonnullis prædita. Pedes maxillares elongati; lamina exterior angusta, margine interiore dentibus elongatis instructo; articuli palpi graciles." The genus is named in honour of Axel Boeck, who mentions *Pardalisca Boeckii* both in 1870 and in his later work, but in neither takes any notice of the genus *Boeckia*. Yet the description which Boeck himself gives of *Leptocheirus pilosus*, Zaddach, tallies so completely with Malm's figures of *Boeckia typica*, as to leave no doubt that they refer to the same species. Since, however, Malm's name is not included in Boeck's list of authors, and his name only, without the title of his work, is cited as authority for *Pardalisca Boeckii*, it is possible or even probable that the work itself for some reason never came into Boeck's hands.

1870. Martens, Eduard von.

Crustacea. The Record of Zoological Literature. 1869. Volume Sixth. London, MDCCCLXX. pp. 598–623.

1871. Cunningham, Robert Oliver, born March 27, 1841 (R. O. C.).

Notes on the Reptiles, Amphibia, Fishes, Mollusca, *and* Crustacea *obtained during the Voyage of H.M.S. "Nassau" in the years* 1866-69 (Plates LVIII., LIX.). Read June 16th, 1870. The Transactions of the Linnean Society of London. Vol. XXVII. London, MDCCCLXXI. pp. 465–502.

Under Amphipoda, page 497, he mentions the following species:—"61. *Orchestoidea tuberculata*, Nic. Common on the sandy beach of San Carlos de Ancud, Chiloe." "62. *Allorchestes patagonicus*, n. sp. (Pl. LIX. fig. 14). A single specimen of an *Allorchestes*, apparently undescribed, was taken by me in a freshwater stream in the neighbourhood of the Chilian settlement of Punta Arenas (Sandy Point) in the Strait of Magellan. Unfortunately it is considerably injured; so I abstain from describing it, and content myself with bestowing upon it the above provisional name." It may be presumed that this is some species of *Hyalella*. The figure appears to give nine peræon-segments with ten side-plates attached to them. "63. *Atylus? Batei*, n. sp. (Pl. LIX. fig. 9). Cephalon not produced into a rostrum. Eyes oblique. A mesial dorsal carina. Last segment of pereion, and first four of pleon, produced into dentiform processes." "A single specimen from Possession Bay, Strait of

Magellan." In the figure the last segment of the peræon, the first two and the fourth of the pleon, are produced into dentiform processes. It is likely enough that it is identical with, or at most a variety of the species next mentioned. "64. *Atylus Huxleyanus*, Bate. Taken in the Strait of Magellan." "65. *Themisto antarctica*, Dana. Taken in numbers in the towing-net between the river Plate and the Strait of Magellan, during a calm which succeeded a violent gale, in November 1867." "66. *Iphimedia Normani*, n. sp. (Pl. LIX. fig. 7). Cephalon produced into a sharp-pointed rostrum. First three segments of pleon having a sharp-pointed tooth on each lateral margin. Eyes subreniform. Superior and inferior antennæ of nearly equal length. Colour purplish. Length 4 lines. One specimen of this species, named in honour of the Rev. A. M. Norman, was dredged off Elizabeth Island in February 1867." The figure shows a peræon of six segments with only five side-plates! Neither figure nor description is adequate for the determination of a species. "67. *Caprella dilatata*, Dana. Taken in numbers on the screw of H.M.S. 'Nassau' in August 1867." Dana's species is considered by Mayer to be the same as *Caprella acutifrons*, Latreille.

1871. Brandt, Alexander.

Ueber die Haut der nordischen Seekuh (*Rhytina borealis* Illig.). Mémoires de l'Académie impériale des sciences de St. Pétersbourg. Sér. VII. t. XVII. No. 7. 1871. pp. 17–23, fig. 17–19.

Dr. Brandt supposes a piece of whale-skin beset with *Cyami* which he found in the St. Petersburg Museum to be the skin of the extinct *Rhytina borealis* bearing the parasite for which J. F. Brandt proposed the genus *Sirenocyamus*. He notices the great similarity between the specimens thus found and *Cyamus ovalis*, Roussel de Vauzème, and Lütken subsequently came to the conclusion that the supposed "*Cyamus Rhytinæ*" was actually *Cyamus ovalis*, attached to the skin, not of *Rhytina borealis*, but of *Balæna japonica*.

1871. Buchholz, Rudolph.

Erlebnisse der Mannschaft des Schiffes Hansa. Königsberg, 1871.

"*Gammarus arcticus* and *Themisto borealis* occur in large swarms in the Arctic Sea, and form the principal food of many marine animals, probably also of the Right Whale." pp. 3–5.

1871. Bütschli, Otto.

Vorläufige Mittheilung über Bau und Entwickelung der Samenfäden bei Insecten und Crustaceen. Zeitschrift für wissenschaftliche Zoologie. Tom. XXI. 1871. pp. 402–415. Nähere Mittheilung über die Entwicklung und den Bau der Samenfäden der Insecten. *Tom. cit.*, pp. 526–534, pls. 40, 41.

The spermatoids of *Gammarus pulex* described on pp. 415, 533, pl. 40, fig. 7.

1871. Claus, C.

Untersuchungen über den Bau und die Verwandschaft der Hyperiden. Nachrichten von der K. Gesellschaft der Wissenschaften und der Georg-Augusts-Universität aus dem Jahre 1871. pp. 149–157. Göttingen, 1871.

This paper describes the discovery of an organ of hearing in the Oxycephalidæ, and many other details of great interest; alludes to *Phronima elongata* under the new name *Phronimella*

elongata; brings *Oxycephalus oceanicus*, Guérin, as a male not fully developed, under *Oxycephalus piscator*, Edw.; assigns *Rhabdosoma whitei*, Sp. Bate, as the male form, to *Rhabdosoma armatum*, Edw.; describes *Oxycephalus tenuirostris*, n. sp.; *Simorhynchus*, n. g.; *Simorhynchus antennarius*, n. sp.; *Schnehageuia*, n. g., afterwards recognised as = *Thamyris*, Sp. Bate; *Schnehageuia rapax*, n, sp.; and in conclusion remarks that the genus *Synopia*, Dana, belongs not to the Oxycephalidæ, but to the Gammaridæ.

For the descriptions of the genera, etc., see Notes on Claus, 1879.

1871. Cope, Edward Drinker, born July 28, 1840 (S. I. Smith).

Life in the Wyandotte Cave. The Annals and Magazine of Natural History. No. 47, for November 1871. Vol. VIII. Fourth Series. London, 1871. pp. 368–370.

This account, borrowed from "Indianapolis Journal, Sept. 5, 1871," refers to a Gammaroid Crustacean, not found in the Wyandotte Cave, but in the waters of the Mammoth Cave. Cope afterwards called it *Stygobromus vitreus*. See Note on Cope, 1872.

1871. Darwin, Charles, born February 11, 1809, died April 19, 1882.

The Descent of Man, and Selection in relation to sex. Second edition. 1885. (First Edition, 1871.)

Remarks bearing on the Amphipoda are made in "Chapter VIII. Principles of Sexual Selection," and "Chapter IX. Secondary Sexual Characters in the Lower Classes of the Animal Kingdom." See pages 209, 233, 237, and especially 265–271, in which Fritz Müller's "Facts and Arguments for Darwin" are utilized, together with information received from Mr. Spence Bate.

On page 485, note 39, these observations are made, "Fritz Müller has shewn ('Facts and Arguments for Darwin,' Eng. Trans. 1869, p. 79) that the males of several Amphipod Crustaceans become sexually mature whilst young; and I infer that this is a case of premature breeding, because they have not as yet acquired their fully developed claspers. All such facts are highly interesting, as bearing on one means by which species may undergo great modifications of character."

On page 568 Darwin says, "an ear to be capable of discriminating noises—and the high importance of this power to all animals is admitted by every one—must be sensitive to musical notes. We have evidence of this capacity even low down in the animal scale; thus Crustaceans are provided with auditory hairs of different lengths, which have been seen to vibrate when the proper musical notes are struck. (Helmholtz, Théorie Phys. de la Musique, 1868, p. 187)."

1871. Dohrn, Anton.

Geschichte des Krebstammes, nach embryologischen, anatomischen und palæontologischen Quellen. Jenaische Zeitschrift für Medicin und Naturwissenschaften Bd. VI. pp. 95–156.

An account of this paper is given in the Zoological Record for 1870, by Dr. von Martens.

1871. Grube, A. Ed.

Mittheilungen über St Malo und Roscoff, und der dortigen Meeres-, besonders Annelidenfauna. Abhdl. d. Schles. Ges. f. vaterl. Cultur, (1870–72), 1872.

According to Dr. von Martens, in the Zool. Record for 1871, he enumerates sixty-two species of Crustacea, observed in the neighbourhood mentioned, and describes "*Urothoe marinus*," Sp. Bate, p. 55, pl. ii. fig. 4.

1871. Martens, Eduard von.

Crustacea. The Zoological Record for 1870; being volume seventh of the Record of Zoological literature. London, M.DCCC.LXXI. pp. 188–206.

1871. Metzger, Ad.

Die wirbellosen Meeresthiere der ostfriesischen Küste. Jahresbericht der naturforschenden Gesellschaft zu Hannover. No. XX. for 1869–70. pp. 31–33. Abstract, Archiv f. d. gesammt. Naturwiss. xxxvi. Bd., 1870, pp. 523–526.

According to Dr. von Martens, in the Zool. Record for 1870, he gives a list of Crustacea observed hitherto on the coast of East Friesland (between the mouths of the rivers Ems and Jahde), containing nineteen Amphipoda, including two Læmodipoda. He describes "*Orchestia*, sp., from the strand of East Friesland, allied to *A.* [*O.*] *mediterranea*, and supposed to be perhaps a second male form of *O. littorea*, Leach." "*Bathyporeia*, sp., dredged and found in the stomach of haddocks," is shortly indicated; so also, "*Podocerus*, sp., frequent between Sertulariæ in the Estuaries." The number was not obtainable at the British Museum Library.

1871. Metzger, Ad.

Die wirbellosen Meeresthiere der ostfriesischen Küste. Zweiter Beitrag. Ergebnisse der im Sommer 1871 unternommenen Excursionen. Einundzwanzigster Jahresbericht der Naturhistorischen Gesellschaft zu Hannover, von Michaelis 1870 bis dahin 1871. Hannover, 1871.

The Amphipoda are referred to on pages 28–32. *Atylus falcatus*, n. s., is thus described:—

"♀. Carina segmenti postabdominis 4ti dentes duos, anteriorem minorem quam posteriorem, formans. Oculi ovales nigri. Rostrum frontale parvum, subrectum. Antennæ inferiores superioribus longiores, longitudinem animalis dimidiam fere æquantes, articulo quinto longiore quam quarto.

"Pedes 2di paris longiores et parum angustiores quam 1mi paris, manu ferme eadem longitudine ac carpo.

"Pedes 3tii paris articulo quarto perbrevi, multo breviore quam quinto; articulo utroque conjunctis longitudinem tertii vix æquantibus; articulo quinto subcurvato, in margine interiore basin versus spinis validis et obtusis armato; ungue pervalido, incurvato (falcato).

"Pedes 4ti paris articulo quarto perbrevi, articulis quarto et quinto conjunctis multo brevioribus quam tertio; articulo quinto subrecto, ungue parvo.

"Pedes 5, 6 et 7mi paris articulo quarto eadem ferme longitudine ac tertio, longitudinem quinti multo superanti.

"Appendix caudalis duplo longior quam ad basin lata, fere usque ad radicem fissa; lacinia utraque in apice spinis singulis armata.

"Longitudo animalis 10 mm."

It can be recognised at the first glance, Metzger says, by the great sickle-shaped finger of the first peræopod. The upper antennæ are somewhat shorter than the lower. The hinder edges of the three first pleon-segments are slightly crenulate, their lower angles are almost rectangular, and only a little drawn out posteriorly. (The species described under the name *Atylus uncinatus* by G. O. Sars, in 1882, seems to be identical with Metzger's *Atylus falcatus*. It must, I should think, belong to the genus *Tritata*, Boeck, but, as unfortunately neither description takes note of the mandibles, the generic position is left a little uncertain.)

The male of *Bathyporeia pilosa*, Lindström (*Bathyporeia pelagica*, Bate) is not rare, he says, "im flachen Wasser am Strande der Inseln und selbst im Wattenmeere (Osterems, Memmertsbalge)," but with the female he has never happened to meet. (On British coasts, *in the sand, uncovered by the tide*, I may notice that the female is far more frequent than the male.)

He confirms the supposition that "Megamoera Alderi," Bate, is the female of *Melita proxima*, Bate.

Nænia excavata, Bate, is found along with *Nænia rimapalmata*, Bate, the latter the more rare.

Siphonoecetes cuspidatus, n. s., is thus described:—"Rostrum frontale gracile, aculeiforme, paulo longius quam anguli laterales capitis, oculos gerentes. Antennæ inferiores longitudine animalis parum modo breviores.

"Pedes 1mi paris manu vix longiore quam carpo oblongo.

"Pedes 2di paris manu multo longiore quam carpo triangulari.

"Pedes 3 et 4ti paris articulo tertio paulo longiore quam lato; ungue longitudinem articuli quarti et quinti junctorum æquanti.

"Ramus exterior pedum saltatorius. 1mi paris in margine exteriore spinis brevibus circiter 8 instructus, in margine interiore inermis; ramus interior in margine exteriore spinis 3 armatus, in margine interiore minutissime denticulatus.

"Pedes saltatorii ultimi paris ramo parvo rotundato, eadem fere latitudine ac longitudine.

"Appendix caudalis spatiis binis scabridis instructa. Longitudo animalis 6 mm.

In further description he says, among other things, "das erste Fusspaar zeigt einen ovalen, am Ende abgestutzten Carpus, dessen innere Vorderecke mit einem längern Dorn versehen ist; die Hand ist kaum so lang wie der Carpus, und der schräge Palmarrand mit zwei grösseren Dornen bewaffnet, zwischen welchen der an der Innenseite sägezähnige Finger einschlägt. Das zweite Fusspaar ist etwas kräftiger als das erste, der dreieckige Carpus kürzer als die Hand und an dem nach innen gerichteten Winkel mit einem kurzen aber kräftigen Dorn endend." At the first glance Metzger took it for a species of *Corophium*.

1871. Sars, G. O.

Beskrivelse af de paa Fregatten Josephines expedition funde Cumaceer. K. Svenska Vetenskaps-Akademiens Handlingar. IX. no. 13. 1871.

"G. O. Sars states that in several genera of *Crustacea* there are two sorts of males, one nearly resembling, the other very different from, the females; the former is much more common and may be found all the year round, the other only in one season; the latter may be the fully developed and the former the incomplete stage of the male. This has been observed in Diastylis, *Pontoporia*, *Apseudes*, and *Philomedes*, and exists therefore in very different orders." (Dr. von Martens in Zool. Record for 1872.)

Compare Note on Faxon, 1884, and Note on Chilton, 1885.

1871. Smith, Sidney Irving, born February 18, 1843 (S. I. S.).

Dredging in Lake Superior under the direction of the U. S. Lake Survey. pp. 373–374. Number XI.

Notice of the Invertebrata dredged in Lake Superior in 1871, *by the U. S. Lake Survey, under the direction of Gen. C. B. Comstock, S. I. Smith, naturalist*, by S. I. Smith and A. E. Verrill. pp. 448–454. Number XII. The American Journal of Science and Arts. New Haven, 1871.

Along with *Mysis relicta*, Lovén, *Pontoporeia affinis*, Lindström, "was found at every haul from the shallowest to the deepest." *Crangonyx gracilis*, Smith, n. s., was also taken, and is here described, with the remark that "the incubatory lamellæ of the female are very large, projecting much beyond the coxæ of the anterior legs, as in *C. recurvatus*, Grube, which our species much resembles in the form of the antennulæ, antennæ, gnathopoda, etc., while it differs much in the ultimate pleopoda and in the form of the telson." *Gammarus lacustris*, Smith, n. s., length 15 to 20 mm., is also here described. It was afterwards named *Gammarus limnæus*.

1871. Troschel, Franz Hermann, born October 10, 1810, died November 6, 1882 (P. Bertkau).

Handbuch der Zoologie. 7th Ed. 1871.

Mayer notices the inaccurate supposition, page 515, that the pleon is *entirely* wanting in the Caprellidæ.

1871. Woodward, Henry, born November 24, 1832 (H. W.).

On Necrogammarus Salweyi (H. Woodward) an Amphipodous Crustacean from the Lower Ludlow of Leintwardine. (February 23, 1871.) Transactions of the Woolhope Naturalists' Field Club. 1870. Hereford, MDCCCLXXI. pp. 271, 272, and Plate.

It is explained that the Crustacean fragment, on which this new genus and species were founded "was noticed and figured in Messrs. Huxley and Salter's important work on the Eurypteridæ (Memoirs of the Geological Survey, Monograph I., 1859, p. 25, pl. XIII., Fig. 7). Professor Huxley observes, 'The fossil figured is evidently Crustacean, but it exhibits no character by which it can be identified as a part of a *Pterygotus*.' (See Fossil Sketches, No. 11, Fig. 2)."

"It presents us with the side-view or profile, of what appear to be three laterally-compressed and thin-crusted somites or body-rings." The feet "are articulated along the border" of the somites. From the dorsal line to the border these somites are said to measure between $1\frac{3}{4}$ and $2\frac{1}{4}$ inches, while from front to back they measure 10 or 11 lines.

"The third segment (*c*) is 10 lines broad and measures 2 inches from the dorsal line to the sharply-pointed epimeral border; from the posterior side of this the limb (*c* 3) is given off of which six joints are visible, the first or basal joint not being seen. Joint (2) is broadly rounded, joint (3) is narrower and more elongated; joint (4) is hollowed out to receive joint (5) which is larger but similar in form to (4) and also to joint (6) which is, however, the smallest of the three [;] joints 4, 5, and 6 have each their distal borders sharply pointed. The 7th and terminal joint is a simple claw, not chelate. The total length of this entire appendage is 2 inches."

It is referred "to the order Amphipoda—Normalia and to the division *Gammaridæ* among some of the natatorial forms of which occur limbs not unlike the fossil before us." It is therefore named "*Nerogammarus Salweyi*, after its discoverer." What forms among the Gammaridæ are here intended it is not easy to guess. The appendage as figured is more suggestive of an antenna or limb of an Isopod than of any form with which I am acquainted among the limbs of the Gammaridæ or any other division of the Amphipoda Gammarina. The combination of a transverse first "(2)" joint with a second "(3)," of great relative size, articulated to the middle of it, is, I should say, quite unknown in the group, and almost impossible as an ancestral character.

1872. Boeck, Axel.

Bidrag til Californiens Amphipodefauna. Særskilt Aftryk af Forhandlinger i Videnskabs-Selskabet i Christiania Aar 1871. Christiania 1872. pp. 32–51.

The species described are *Caprella californica*, Stimpson = ? ? *Caprella linearis*, see Mayer, Caprelliden, p. 79; *Caprella verrucosa*, A. Boeck = ? *Caprella acanthifera*, Leach, juv., see Mayer, Capr., p. 82; *Erichthonius rapax*, Stimpson, which Boeck transfers (erroneously) to the genus *Cerapus*; *Podocerus californicus*, A. Boeck; "*Amphithoë Stimpsoni*," A. Boeck; "*Paramphithoë Bairdi*," A. Boeck, and "*Metopa Esmarki*," A. Boeck. An explicatio tabulæ concludes the paper, but unfortunately the plate to which the explanation refers never appeared. The report of the Society's meetings during 1871 states, under March 10th, p. 532, that "A. Boeck indleverede Tegninger af 6 nye Arter Amphipoder, som Esmark havde sendt ham fra Californien, og fremsatte nogle Bemerkninger om Amphipodernes Udbredelse og Udseende i de forskjellige Egne af Jorden." If the drawings are still in existence, it is very desirable that they should be published.

1872. Boeck, Axel.

De Skandinaviske og Arktiske Amphipoder, beskrevne af Axel Boeck. Förste Hefte. (Med 7 Kobberstukne Tavler.) Christiania, 1872. pp. 1–160.

This, and the succeeding volume published in 1876, constitute a work of vast labour and research, of foremost importance to the student of the Amphipoda. The introductory part contains, first, a general account of the bodily structure in this group, dealing chiefly with the mouth-organs, on which Axel Boeck laid special sytematic weight; secondly, an alphabetical list of nearly three hundred authors with the titles of their works relating to the Amphipoda, down to the year 1870; and thirdly, a chronological review of the development of this branch of natural history from Aristotle down to the year 1855. It winds up with an article on the geographical distribution of the Amphipoda, and an account of various systems, including the author's own, which have been proposed for the classification of this group.

It is to be regretted that this ingenious author should have in some cases thought it necessary to ground generic distinctions on very minute differences; and it sometimes detracts from the pleasure and facility of consulting his accurate plates, that many of the figures are exceedingly small, and that not unfrequently the parts of animals in different genera are represented in embarrassing confusiou on the same plate. Most of all it is to be regretted that by his early death this author was prevented, not only from putting the last touches and corrections to his almost completed work, but from further pursuing a study in which there is so much still to be done, and in which he was so eminent a master.

To the following Table, drawn from Boeck's work, I have only added, for facility of reference, the numbers of the pages on which the several groups are described :—

Divisioner.	Familier.	Underfamilier.
Amphipoda Hyperina, p. 76.	Hyperidæ, p. 77.	
	Tryphanidæ, p. 90.	
Amphipoda Gammarina, p. 94.	Prostomatidæ, p. 95.	
	Orchestidæ, p. 99.	
	Gammaridæ, p. 111.	Lysianassinæ, p. 112.
		Pontoporinæ, p. 194.
		Phoxinæ, p. 212.
		Œdicerinæ, p. 254.
		Epimerinæ, p. 227.
		Dexaminæ, p. 310.
		Atylinæ, p. 320.
		Gammarinæ, p. 362.
	Leucothoidæ, p. 418.	Stegocephalinæ, p. 419.
		Amphilochinæ, p. 430.
		Stenothoinæ, p. 445.
		Syrrhoinæ, p. 470.
		Pardaliscinæ, p. 480.
		Leucothoinæ, p. 494.
		Iphimedinæ, p. 235.
	Ampeliscaidæ, p. 516.	
	Photidæ, p. 546.	Leptocheirinæ, p. 546.
		Photinæ, p. 552.
		Microdeutopinæ, p. 563.
	Podoceridæ, p. 586.	Amphithoinæ, p. 586.
		Podocerinæ, p. 598.
	Corophidæ, p. 619.	Corophinæ, p. 621.
		Helæinæ, p. 642.
	Cheluridæ, p. 645.	
	Dulichidæ, p. 649.	
Amphipoda Caprellina, p. 668.	Caprellidæ, p. 669.	
	Cyamidæ, p. 703.	

There are no new species described in this volume, but the descriptions of those already known and the attendant observations are of the highest value.

Of the family Prostomatidæ he gives the following definition :—"Instrumenta cibaria valde prominentia et conjuncta processum 3 fissum, tubiformem formantia. Labium superius prælongatum, angustum. Mandibulæ styliformes, acutæ, palpis longis triarticulatis instructæ. Maxillæ angustæ, elongatæ, in apice acuminatæ. Pedes maxillares laminis interioribus angustis, exterioribus brevibus et latioribus; articulo palpi 4to longo, non ungviformi. Corpus compressum, latum; epimeris latis. Antennæ superiores breves, flagellis accessoriis instructæ. Pedes 1mi paris manu pervalida subcheliformi. Pedes 2di paris elongati, angusti; manu subcheliformi, parva. Pedes saltatorii biramei; ramis latis. Appendix caudalis parvula."

The genus *Trischizostoma* is thus defined :—"Caput antice in rostrum frontale crassum, latum, in apice rotundatum, productum. Antennæ inferiores articulo 4to longitudinem 5ti superanti. Pedes 1mi paris manu permagna, inflata, ovata; ungve non in angulo inferiore anteriore, ut solito, sed in angulo inferiore posteriore inarticulato, antice verso. Pedes 4ti paris articulo 3tio valde dilatato et latiore quam pedum 3tii paris. Epimerum 1mum parvum. Epimerum 2dum deorsum valde dilatatum, 1mum partim tegens. Oculi permagni. Appendix caudalis lata." In regard to this genus see Note on Costa, 1853.

1872. Brandt, Alexander.

Bericht über die Cyamiden des zoologischen Museums der Kaiserlichen Akademie der Wissenschaften zu St Petersburg. $\frac{23\text{ Mai}}{4\text{ Juni}}$ 1872. Mélanges Biologiques tirés du Bulletin de l'Académie impériale des sciences de St.-Pétersbourg. Tome VIII. pp. 673–702. (Aus dem Bulletin, T. XVIII, pp. 113–133. Oct. 1872.)

A new species, "*Cyamus Kessleri*," is figured and described, with the following diagnosis, "Corpus maris pyriforme, feminæ obverso-pyriforme vel rhomboideum. Maris primi paris manus dente armatæ, feminæ fere edentulæ. In utroque sexu manus secundi paris duobus dentibus munitæ, quorum basalis multo major. Branchia simplicia, elongata, longitudine corpus fere æquantia. In mare appendicum branchialium sex paria inæqualia. Habitat in sinu Metschigmensi Maris Beringii, in Balænis." Lütken considers that the accessory branchiæ on the third and fourth segments are double, not triple, and that Brandt has confused with these appendages the postero-lateral angles of the segment which form a process bent downwards and forwards.

Cyamus ovalis, Roussel de Vauzème, is recognised as including "*Cyamus Rhytinæ* (*?*)" which in 1871 Brandt supposed that he had re-discovered, though with notice of its great resemblance to *Cyamus ovalis*.

The name *Cyamus ceti*, auctorum, is upheld for *Oniscus ceti*, Lin., against the proposal of Lütken to institute the designation *Cyamus mysticeti*. For *Cyamus ceti*, Sp. Bate (Catal. Amph. Crust. [p. 366, pl. lviii. fig. 2), a very narrow elongate form from Talcahuna, which has nothing in common with *Oniscus ceti*, Lin., he gives a name proposed by Lütken, *Cyamus pacificus*. Without absolutely deciding, Brandt seems inclined to regard *Cyamus monodontis*, Lütken, as a variety of *Cyamus ceti* (to which Lütken himself regards it as "valde affinis"), and to agree with Bate and Westwood (Brit. Sess. Crust. vol. ii. p. 86) in making *Cyamus erraticus*, Roussel de Vauzème, a synonym of the same *Cyamus ceti*, which Lütken regards as a very decided error. Brandt notes that *Cyamus boopis*, Lütken, is recognised by its author as in close relationship to *Cyamus erraticus*, and this latter he is willing to regard as a link between *Cyamus ceti* and *Cyamus boopis*, leaving it perhaps an open question whether they may not all be one species. *Cyamus globicipitis*, Lütken, he thinks probably identical with "*Cyamus Delphini*," Guérin (Icon. du Règne Anim. T. III. p. 25, pl. xxviii. fig. 5). Remarks are made on *Cyamus nodosus*, Lütken, and *Cyamus gracilis*, Rouss. de Vauzème. *Cyamus thompsoni*, Gosse, which Lütken transferred to a new genus, under the name of *Platycyamus thompsoni*, Brandt would have been content to leave united to the other *Cyami*.

1872. Claus, C.

Zur Naturgeschichte der Phronima sedentaria Forsk. Mit Tafel xxvi. xxvii. Zeitschrift für wissenschaftliche Zoologie. Bd. XXII. pp. 331–338.

Claus here states his conviction that the cell inhabited by *Phronima* is derived exclusively from smaller or larger specimens of *Pyrosoma* eaten out for the purpose. He describes the differences presented by the male form of *Phronima sedentaria*. Guérin's *Phronima atlantica* he regards as nothing but "das noch jugendliche, kleine, aber doch schon fortpflanzungsfähige Weibchen" of the same species, and thinks that Spence Bate did wrong in giving a separate specific name, "*Phronima Borneensis*," to White's variety of *Phronima atlantica* from Borneo. Compare Note on Streets, 1877.

Referring to his own earlier observation of rudiments of a second pair of antennæ on the head of the young *Phronimella elongata*, he says that he wrongly concluded that the Phronimidæ in general might have both pairs of antennæ in rudiment to start with, the females eventually developing only the front pair. He found, however, that in the little, sexually indifferent, young ones of *Phronima sedentaria* there was no trace of the hinder pair; in individuals 4 mm. long sexual difference was shown in the front antennæ, and in larger forms the position of the coming second pair of antennæ was indicated. The sexual organs of the male are described and figured.

1872. Cope, E. D.

Descriptions of species from the Mammoth Cave. The American Naturalist. Vol. VI. July, 1872.–No. 7. Vol. VI. Salem, Mass. Peabody Academy of Science, 1872. pp. 421–422.

The new genus which Cope established for the Gammarid, which he found in the Mammoth Cave, is thus described:—

"*Stygobromus*, Cope, Gen. nov. *Gammaridarum*. Near *Gammarus*. The first antennæ with flagellum, and much shorter than the second. Two pairs of limbs chelate by the inflexion of the last claw-like segment; other limbs clawed. Terminal abdominal segment very short, spiniferous; the penultimate segment with a stout limb with two equal styles, the antepenultimate short, two-jointed and undivided. Eyes none.

"This genus is nearer to the true *Gammarus* than the allied genus described from the Austrian Caves, the *Niphargus* of Schiödte (Proc. Entom. Soc. London, 1851, p. 150). In the latter the first antennæ are the larger, and the body terminates in a very long style; the last abdominal limb is undivided like that which precedes it. In *Stygobromus* the penultimate limb is like that represented by Schiödte for *Niphargus*, though I am not certain whether it is homologically identical. The last limb is about equally divided, but the simple basis is long and stout.

"It is just possible that the antepenultimate limb represents the basis and one style only, for in that of one side a slight process appears at the extremity of the basal segment, though it is not visible on that of the other. The terminal limbs are recurved and appressed to the last abdominal segment, forming a fulcrum or prop. The animals of this genus are aquatic, and swim much as the common *Gammari*. The absence of eyes is another example of the adaptation to darkness."

The type species he describes thus:—"*Stygobromus vitreus*, Cope. 'Gammaroid Crustacean' Cope, Ann. Mag. Nat. Hist., Nov., 1871. Two last pairs of limbs appressed to last

abdominal bristles and of nearly equal length, forming a brush. Last segment of abdomen with two terminal bristles. Last segment of the limbs from the third to the seventh, with a long, straight claw directed forwards. Fringed limbs behind this point very small. Outer or second antennæ half as long as the first, which embrace eleven segments, and are about as long as the last five abdominal segments. Total length of head and body 2·1 lines or ·0045 m. There are few conspicuous hairs, the most so are those which stand at the extremity of the last joint of the limbs, rising from the base of the claw. Color translucent."

S. I. Smith, 1875, considers Cope's description very inadequate, but identifies the genus *Stygobromus* with the earlier *Crangonyx*.

1872-3. Dall, William Healey, born August 21, 1845 (S. I. Smith).

Descriptions of three new species of Crustacea parasitic on the Cetacea of the N. W. Coast of America. The Annals and Magazine of Natural History. Number LXII. Vol. XI.—Fourth Series. London, 1873. pp. 157–158. (From Proceedings of the California Academy of Sciences, November 1872.)

He describes the three species as follows:—

"*Cyamus Scammoni*, n. sp.—Male. Body moderately depressed, of an egg-ovate form; segments slightly separated; third and fourth segments furnished with a branchia at each side; this, near its base, divides into two cylindrical filaments spirally coiled from right to left; at the base of each branchia are two slender accessory filaments not coiled, quite short, and situated one before and the other behind the base of the main branchia; second pair of hands kidney-shaped, with the carpal articulation halfway between the distal and proximal ends, and having two pointed tubercles on the inferior edge, before the carpal joint; third and fourth segments somewhat punctate above, all the others smooth, the sixth and seventh slightly serrate on the upper anterior edge, and without ventral spines. Colour yellowish-white. Long. ·70, lat. ·39 in., of largest specimen.

"Female similar to the male in all respects, except in being a little more slender, and in wanting the accessory appendages to the branchiæ; the ovigerous sacs are four in number, overlapping each other.

"*Hab.* On the California grey whale (*Rhachianectes glaucus* of Cope) on the coast of California, very numerous."

"*Cyamus suffusus*, n. sp.—Body flattened, elongate; segments subequal, outer edges widely separated; branchiæ single, cylindrical, slender, with a very short papilliform appendage before and behind each branchia; superior antennæ unusually long and stout; first pair of hands quadrant-shaped; second pair slightly punctate, arcuate, emarginate on the inferior edge, with a pointed tubercle on each side of the emargination; third joint of the posterior legs keeled above, with a prong below; pleon extremely minute; segments all smooth; no ventral lines on the posterior segments. Colour yellowish-white, suffused with rose-purple, strongest on the antennæ and branchiæ. Length ·41, breadth (of body) ·25 in. All the specimens which have passed under my observation, some eight or ten in number, were males.

"*Hab.* On the 'humpback' whale (*Megaptera versabilis*, Cope), Monterey, California."

"*Cyamus mysticeti*, n. sp.—Body flattened, subovate, segments adjacent; branchiæ single, short, stout, pedunculated, a single papilliform appendage behind each; head short and wide; first pair of legs very small; hands all simple and smooth, fingers greatly recurved; carpal articulation in the second pair of hands halfway between the proximal

and distal ends of the hand; pleon very minute. Colour dark brownish-yellow. Length ·33 in., breadth (of body) ·16 in. Two female specimens.

"*Hab.* On the northern 'bowhead' whale (probably *Balæna mysticetus*, Linn.), near Behring Strait.

"This is the most compact of the three species, as well as the smallest. I find, in comparing large series of *C. Scammoni*, that a considerable variation in form obtains, so far as regards comparative length and breadth, even in adult specimens, and these differences are greater than those observed, in the same characters, between the sexes."

Lütken is of opinion that the *Cyamus mysticeti* here mentioned is the same as his own *Cyamus mysticeti*, 1870. A. Brandt, 1872, as already noticed, does not admit the propriety of giving up the old name, *Cyamus ceti*, for this species. Indeed, no names would be safe, if subsequent confusion of heterogeneous animals, under a name rightly established to begin with, were allowed to make such a name void. For "no ventral lines," in the description of *Cyamus suffusus*, Lütken thinks "no ventral spines" should be read. The species may, he supposes, be the same as his own *Cyamus pacificus*, which also lives on *Megaptera versabilis*, C.

1872–3. Dall, W. H.

On the Parasites of the Cetaceans of the N. W. Coast of America, with Descriptions of New Forms. The Annals and Magazine of Natural History. Number LXIII. Vol. XI.—Fourth Series. London, 1873, p. 238. (From Proceedings of the California Academy of Sciences, December 18, 1872.)

He here adds, in regard to *Cyamus suffusus*, "the females, which were unknown at the date of my description, now prove to resemble the male in every respect, except in regard to the sexual organs, and in being a trifle more slender in form." All the specimens came from the humpback (*Megaptera versabilis*, Cope). Dall favours "the hypothesis that each species of whale has its own peculiar parasites, and that there is rarely more than one species of *Cyamus* found upon one animal."

1872. Fric (Fritsch), Anton.

Die Krustenthiere Böhmens. Archiv für die naturwissenschaftliche Landesforschung von Böhmen. II. Prag, 1872. pp. 203–269.

Among the Crustacea which have been observed in Bohemia, and are here described, Dr. von Martens, Zool. Record for 1872, says that two Gammaridæ are included.

1872. Hoy, P. R.

Deep-water Fauna of Lake Michigan. Transactions of the Wisconsin Academy of Sciences, Arts, and Letters, 1870–2. Madison, Wis., 1872. pp. 98–101. (Also in the Annals and Magazine of Natural History. Vol. XI.—Fourth Series. London, 1873. p. 320.)

He records from the stomachs of white-fish, and from dredgings at depths of 50 to 70 fathoms, three species of Amphipods determined by Dr. William Stimpson. Nothing, however, but

the names is given. They are styled "Gammarius Hoyi—Stimpson; Gammarius brevistilus —Stimpson; Gammarius filicornis—Stimpson." Gammarius is of course an accidental error for *Gammarus*. S. I. Smith, 1874, calls the first two of these species "Pontoporeia Hoyi," the third "*Pontoporeia filicornis*." See p. 433.

1872. MURIE, JAMES.

On the Skin &c. of the Rhytina, *suggested by a recent Paper of Dr* A. Brandt's. The Annals and Magazine of Natural History. Number LII. Vol. IX. Fourth Series. London, 1872. pp. 306–313. Pl. XIX.

Dr. Murie does not agree with some of Dr. Brandt's deductions in regard to the skin of the *Rhytina*. He quotes or refers to his remarks upon "*Cyamus Rhytinæ*," and reproduces Brandt's figures of it. But the paper was written before Lütken had criticised Brandt's supposed discovery.

1872. NICHOLSON, HENRY ALLEYNE.

Preliminary Report on Dredgings in Lake Ontario. The Annals and Magazine of Natural History. Number LVIII. Vol. X. Fourth Series. London, 1872. pp. 276–285.

Under Crustacea he enumerates two species of *Gammarus*, one of *Crangonyx ?*, and *Pontoporeia affinis*, Lindström. The specimens to which he applies the last name are, he says, "small Amphipods varying in length from $\frac{1}{10}$ up to $\frac{1}{4}$ inch, of nearly uniform flesh-colour. They are referable to the genus *Pontoporeia;* and though they have not yet been satisfactorily examined, I have little doubt as to their being identical with the *Pontoporeia affinis* of the Swedish lakes and of Lake Superior. They occur in great plenty in from 30 to 45 fathoms."

1872? PACKARD, A. S., JR.

Annual Report of the Trustees of the Peabody Academy of Arts and Sciences. V. p. 95.

In regard to his *Crangonyx vitreus*, see Note on S. I. Smith, 1875.

1872? ULJANIN, B.

Izvestia Imperatorskeio Obshtshestva Ljubiteloi Testestvasnanija (Trans. Imp. Soc. Nat. Sci. Moscow). IX. pp. 68–79.

Thirty-eight species of Amphipoda are enumerated as inhabitants of the Black Sea. (Dr. von Martens, Zool. Record for 1872.)

1872. Whiteaves, J. F.

Notes on a Deep-Sea Dredging Expedition round the Island of Anticosti, in the Gulf of St. Lawrence. The Annals and Magazine of Natural History. Number LIX. Vol. X. Fourth Series. London, 1872. p. 341.

Under Crustacea he says, "Several curious Amphipods were taken, among the more conspicuous of which were fine specimens of an *Epimeria*, which Mr. Smith refers doubtfully to *E. coniger* of Boeck." *Epimeria cornigera* is obviously intended.

1873. Hartmann, R.

Sitzungsberichte der Gesellschaft naturforschender Freunde zu Berlin, 1873. p. 94.

"The strange shovel-shaped appendages in the male of *Gammarus pulex* are mentioned." (Dr von Martens, Zool. Record for 1873.)

1873. Hesse, E.

Mémoire sur les Crustacés rares ou nouveaux des côtes de France. (Vingt et unième article.) Description de Crustacés nouveaux appartenant à la légion des *Edriophtalmes*, de l'ordre des *Amphipodes*, de la famille des *Piscicoles*, de la tribu des *Enoplopodes*, Nobis, du genre des *Ichthyomyzoques*, Nobis. Annales des Sciences Naturelles. Cinquième série. Tome XVII. Paris, 1873. pp. 1–16. Pl. IV.

The new genus *Ichthyomyzocus* is thus defined :—

"*Corps* ovalaire, légèrement déprimé, bombé en dessus, plat et même un peu creux en dessous.

"*Tête* petite, aplatie, triangulaire ; front lamelleux s'avancant horizontalement en pointe arrondie et recouvrant la base des antennes ; celles-ci grosses, courtes, à peu près d'égale longueur et composées de cinq à sept articles.

"*Yeux* grands, réniformes, très-écartés, placés obliquement, en dessus de la tête et formés de cornéules bien distinctes.

"*Abdomen* moins large que le thorax, formé seulement de cinq ou de deux anneaux, également sans bordure épimérienne, les derniers portant de chaque côté des tiges arrondies terminées par de petites lames ovales et pointues.

"*Bouche* proéminente, formée d'un labre supérieur, de pattes-mâchoires latérales armées de griffes, et d'autres plates, sous lesquelles ou aperçoit de petites mandibules qui environnent l'orifice buccal.

"*Pattes thoraciques* au nombre de sept paires, dont les trois premières sont ancreuses et dirigées du côté de la bouche ; les quatre autres paires plus grêles et plus longues, terminées par un ongle légèrement recourbé, quelquefois l'article femoral étant large et plat. Les *fausses pattes branchiales* composées d'une double tige cylindrique, fusiforme, divisées en nombreux anneaux garnis de longs poils rigides et pennés. L'abdomen, dans l'état de repos, se reployant sous le thorax, et celui-ci garni, chez la femelle, de larges plaques membraneuses qui, en s'imbriquant les unes dans les autres, forment une poche incubatoire.

"Ces Crustacés vivent en parasites sur les Poissons."

The species are described and figured under the following headings :—"A.—Abdomen formé de cinq articles et terminé par trois tiges." Ichthyomyzoque orné.—*Ichthyomyzocus ornatus* n. s., figs. 1, 2, on *Morrhua vulgaris*. "C'est probablement un mâle."

"B.—Abdomen formé de cinq articles et terminé par trois paires de tiges." Ichthyomyzoque du Gade morue.—*Ichthyomyzocus Morrhuæ*, n. s., figs. 3–7, on *Morrhua vulgaris*. "C'est un individu femelle." Ichthyomyzoque de la Baudroie commune—*Ichthyomyzocus Lophii*, n. s., figs. 8–18, on *Lophius piscatorius*. "Notre dessin représente une femelle adulte, mais sans œufs."

"C.—Abdomen formé de deux articles et terminé par deux paires de tiges." Ichthyomyzoque de la Squatine ange—*Ichthyomyzocus Squatinæ*, n. s., figs. 19–27, on *Squatina angelus*.

In *Ichthyomyzocus lophii*, a singular appendage is described on the thoracic feet of the first three pairs, "placé à leux extrémité et à la base des griffes qui les terminent. Cet appendice ressemble, pour la forme, à un pistil dont on aurait conservé seulement l'*ovaire* et le *style*. Nous ignorons si les autres espèces ont aussi des appendices de ce genre, ou s'ils sont propres à celle-ci seulement." He compares it to the *gaffe* which sailors use.

By the front of the body, M. Hesse considers that these animals come very near to the Isopods, but by the lower extremity of the body they resemble the Amphipods. The upper part of the head is broader than the lower, at the extremity of which the buccal opening is placed. "Du haut du front et de la base du prolongement frontal part une ligne verticale en relief, nasiforme, qui descend perpendiculairement en diminuant de longueur jusqu'à l'orifice de la *bouche*, dont elle forme le *labre* supérieur. De chaque côté et au dessus de cet orifice, on aperçoit une paire de pattes-mâchoires composées de deux articles, dont le second est terminé par une longue griffe crochue et acuminée, dont la pointe est dirigée vers le bas. Au-dessous de celle-ci sont également placées deux paires de pattes-mâchoires plates et ovales, dont la première, qui est la plus grande, est large, plate et accompagnée de son *fouet ;* l'autre, plus petite, se trouve des deux côtés de la bouche. Enfin, entre celui-ci on aperçoit les mandibules, qui sont petites et cachées, en ne laissant voir que les denticules dont elles sont bordées. La *region thoracique* est, comme cela a lieu pour les femelles de *Cymothoadiens rarisseurs*, entièrement recouverte de larges lames ovalaires membraneuses et très-minces, qui partent de l'insertion de chaque patte et se portent horizontalement en dedans, de manière, en s'imbriquant les unes dans les autres, à former une *poche incubatoire*. Les *fausses pattes abdominales* ou les organes de la respiration ne se composent pas, comme dans les *Cymothoadiens*, de grandes lames plates, ovalaires, membraneuses, recouvrant en se superposant ; elles se rapprochent, par leur conformation, de celles des *Amphipodes*. Elles ont un pédoncule aplati, presque aussi large que long, sur lequel sont fixées, de chaque côté, deux tiges assez longues, presque cylindriques, multiarticulées, larges au milieu et étroites à leur extrémité, chaque anneau étant bordé d'une série de poils longs et rigides, et pennées. Les *pattes thoraciques* sont au nombre de sept paires. Les trois premières, et la première surtout, sont ancreuses." "Les quatre autres paires de pattes sont ambulatoires." "Elles sont formées de cinq ou six articles, dont le premier et le dernier sont les plus longs. On remarque aussi que, dans les pattes ambulatoires, l'article fémoral est très-large et très-plat, et que, sous ce rapport, ils ressembleraient aux *Amphipodes*." In the abdomen, which is much narrower than the thorax, the last segment "se termine par un prolongement gros et arrondi, vers le bas duquel on aperçoit facilement l'orifice anal qui est relativement très-grand. Les trois derniers anneaux donnent attache, de chaque côté, à deux ou trois paires de tiges arrondies, dont les extrémités ne se dépassent pas, bien que cependant elles soient, à raison de leur point de départ, d'une longueur inégale. Elles sont terminées chacune par deux petites lames ovales et pointues à leurs deux extrémités ; et sous ce rapport, ils ressemblent aux *Amphipodes* de la division des *Crevettines marcheuses*, tel que les *Corophies* ou les Hypérines, ainsi que les *Vibilies* et les *Phronimes*."

The expressions "les *fausses pattes branchiales*" and "les *fausses pattes abdominales* ou les organes de la respiration" would appear to be incorrect; if accurate, they would be inconsistent with the arrangement of this genus in the order Amphipoda. That one species of the genus should have a pleon of only two segments, while its congeners have the five segments which are the normal number for the pleon among the Hyperina, is a very strange peculiarity. But as to this and other points, see additional Note on Hesse, in Appendix.

1873. Lütken, Chr. Fr.

Bidrag til Kundskab om Arterne af Slægten *Cyamus* Latr. eller Hvallusene. Med 4 Tavler og et fransk Résumé. Vidensk. Selsk. Skr. 5 Raekke, naturvidenskabelig og mathematisk Afd. 10 B. III. Kjobenhavn, 1873. (Mémoires de l'Académie Royale de Copenhague. 5me série. Classe des Sciences Vol. X. *No.* 3.)

After repeating the observations on *Cyamus* which he had made in 1860, Lütken gives an exceedingly valuable report upon the historical development of our acquaintance with the group of Crustacea, which are called whale-lice. From Frederik Martens in 1675 to the date of his own work, Lütken's vigorous research can scarcely have let any statement of importance on the subject escape him, or any serious error pass the ordeal of his criticism without correction.

The definition he gives of *Cyamus*, Latr., is as follows:—

"*Corpus crassum, haud laminare. Pedes primi paris minuti, sub pedibus secundi paris fere vel omnino absconditi; annulus corporis primus a capite indistincte sejunctus vel cum hoc plane confluens. Pedes maxillares quinque-articulati. (Mares femininis vulgo majores.)*"

The species described are, 1. *Cyamus mysticeti*, Ltk., from *Balæna mysticetus*, the common, or Greenland Whale; 2. *Cyamus monodontis*, Ltk., from *Monodon monoceros*, the Narwhal; 3. "*Cyamus Kessleri*," Brandt, "coming from the northern part of the great eastern ocean, probably from a true whale of the group of *Balæna australis* and *Balæna biscayensis*"; 4. *Cyamus erraticus*, Roussel de Vauzème, from *Balæna australis*, the Cape Whale; 5. *Cyamus boopis*, Ltk., the *Oniscus ceti* of O. Fabricius, 1780, from the Northern Hump-back, the Krepokak of the Esquimaux, *Megaptera boops*, and possibly parasitic on other species of *Megaptera*; 6. *? Cyamus pacificus*, Ltk., from a whale (of unknown genus and species) in the Pacific in the neighbourhood of Panama, a species nearest in form to *Cyamus boopis*, but also near to *Cyamus erraticus*; 7. *Cyamus ovalis*, Rouss. de Vauz., from protuberances on the head of *Balæna australis* and from the North Pacific "Sletbag" (*Balæna japonica ?*); 8. "*Cyamus Rhytinæ*," J. F. Brandt, Steller's species, for which Brandt proposed a new genus *Sirenocyamus*, and which Lütken agrees with Brandt in thinking possibly akin rather to *Proto* than to *Cyamus*; 9. *Cyamus nodosus*, Ltk., the *Oniscus ceti* of the Zoologia Danica, III. p. 69, pl. 119, f. 13–17, 1789, from the Narwhal, *Monodon monoceros*; the name "Cyamus Belugæ" sometimes given to this species being rejected by Lütken as grounded on the mistaken supposition that the creature is also a parasite of *Delphinapterus beluga*; 10. *Cyamus globicipitis*, Ltk., a species already noticed as possibly new, but not named, by Steenstrup in 1843 [?1850], parasitic on the Caaing, or Pilot Whale, *Globiocephalus melas*; 11. *Cyamus gracilis*, Rouss. de Vauz., from the protuberances of the head of *Balæna australis* and *Balæna japonica?*; 12. *Platycyamus thompsoni*, Gosse, parasitic on the Bottlehead, or Beaked Whales, *Hyperoodon rostratus* and *Hyperoodon latifrons*.

The new genus, *Platycyamus*, instituted to receive Gosse's *Cyamus thompsoni*, is defined as follows:—

"*Corpus valde depressum, laminare fere; pedes primi paris pedes secundi paris magnitudine*

fere æquantes hisceque antepositi, annulo primo corporis a capite bene sejuncto, pedes maxillares haud articulati. (Mares feminis minores.)"

The opinion that *Cyamus pacificus* may perhaps better be classed as a variety of *Cyamus boopis*, "seems confirmed," Lütken says, "by the fact that young *Cyami*, taken upon unknown Cetacea, in the Pacific, near the Isles of Tonga and Rarotonga, come extremely near to the species parasitic on the *Megaptera* of the northern seas, and are probably identical with it."

In addition to the ten well-defined species of the above list, Lütken calls attention to various others less well-known. These are :—

1. The species which, according to Bennett, are parasitic on the *Cachalot* and several *Delphini* and *Globiocephali* (plusieurs Dauphins et Globiocéphales) of the southern seas. The parasite of the *Cachalot*, he notes, may possibly be *Cyamus pacificus*, though Roussel de Vauzème did not find any *Cyamus* upon the *Cachalot*.
2. "*Cyamus Delphini*," Guérin (from some species of *Delphinus* in the West Indies), "very near to *Cyamus globicipitis*, if not identical with it."
3. A *Cyamus*, also from some unknown *Delphinus*, regarded by Lütken as certainly a distinct species, though as the specimen is not full grown, and its habitat uncertain, he leaves it unnamed.
4. A whale-louse, which according to a plate published by Dr. Monedero, is, or used to be, parasitic on the Sarde or Basque whale (*Nordkaperen* eller *Sardens* Hvallus), instead of which on the plate in question a *Pycnogonum* is figured.

The species are pretty equally divided between the Mysticete, or Whalebone whales, and the Denticete, or Toothed whales, but hitherto not a single species has been found on a genuine Fin-whale (*Balænoptera*). One species of Cetacean may entertain more than one species of these parasites, and the same species of *Cyamus*, just as the same species of Cirripede, may occur on very nearly related species of Cetacea, especially on species of the same subgenus.

A postscript mentions Dall's new species "*Cyamus Scammoni*," which lives on the Californian Grey whale, *Rhachianectes glaucus*, Cope, and which Lütken thinks will stand between *Cyamus ovalis* and "*Cyamus Kessleri*." Another species, *Cyamus suffusus*, Dall, from the Humpback, *Megaptera versabilis*, he considers to come near, perhaps to be identical with, *Cyamus pacificus*.

1873. Martens, Eduard von.

Crustacea. The Zoological Record for 1871; being Volume Eighth of the Record of Zoological Literature. London, M.DCCC.LXXIII. pp. 179–196.

A synopsis is given of Boeck's Amphipoda, 1870. The name *Tryphosa* is noted as preoccupied in *Lepidoptera*, but I am informed by Mr. Edward Saunders, the entomologist, that the name as used by Stephens for a genus of *Lepidoptera* has a different spelling, *Triphosa*, not *Tryphosa*, and that without variation so far as he could trace it.

1873. Möbius, Karl, and Metzger, A.

Jahresbericht der Commission zur wissenschaftlichen Untersuchung der deutschen Meere in Kiel für das Jahr 1871. 1. Jahrgang. Berlin, 1873. (With second Title page); Die Expedition zur physikalisch-chemischen und biologischen Unter-

suchung der Ostsee im Sommer 1871 auf S. M. Avisodampfer Pommerania nebst physikalischen Beobachtungen an den Stationen der preussischen Ostseeküste. Berlin, 1873.

On behalf both of those who have to make catalogues of books, and of those who have to consult them, it is much to be wished that short titles should be used to name rather than to describe a work, and that above all things double title pages should be avoided.

"IV. Die faunistischen Untersuchungen. A. Die wirbellosen Thiere der Ostsee," pp. 97–144. K. Möbius.

The Amphipoda are catalogued on pages 117–119, with particulars as to the place of capture, depth, nature of ground, and distribution. Fifteen species are named, beginning with "Caprella linearis L.," and "Leptomera pedata Abildg.," and ending with "Talitrus locusta L." To *Pontoporeia femorata*, Kroyer, *Pontoporeia affinis* is made a synonym, with the remark, "Herr Lindström schickte mir Exemplare, die er bei Gotland gefangen hatte, mit dem Namen *P. femorata* zu; er hat also seinen Speciesnamen *affinis* selbst zurückgenommen." To "Orchestia littorea Mont.," the remark is appended, "Der Vorsprung am unteren Rande des 5. Gliedes des 2. Fusspaares ist bei Exemplaren von Stubbenkammer und Kiel kleiner als bei Exemplaren von Greifswald; bei Exemplaren von Sylt fehlt er ganz. Im Uebrigen stimmen alle überein." To this species "*Orchestia Euchore*," Fr. Müller, is assigned as a synonym. Müller's "*Orchestia Gryphus*" is made synonymous with "Orchestia Deshayesii Savig." In the general observations, *Gammarus locusta* and *Pontoporeia femorata* are mentioned among those species which occur in the greatest numbers. *Gammarus locusta* was occasionally found along with the *Temora longicornis* which made up the chief part of the contents of the stomachs of herrings. In various other fishes, less suited for consuming the *Temora*, *Gammarus locusta* was found as one of the constituents of the food.

In the preface, Möbius remarks that "Die Fauna der Ostsee ist ein verkümmerter Zweig der reichen Fauna des nordatlantischen Oceans und des nördlichen Eismeeres." One of the conclusions drawn is that "*Die Ostsee enthält überhaupt nur eine Auswahl solcher atlantischen und Eismeerthiere, welche grosse Temperaturdifferenzen zu ertragen im Stande sind.*" Such animals are distinguished as *eurytherm*, in opposition to *stenotherm* animals, which can live only in warm or only in cold water. All Baltic marine animals can live in water of varying saltness, and are therefore said to be *euryhaline*. In Section "C. Die auf der Fahrt nach Arendal gefangenen Thiere," on page 153, he mentions, "Caprella linearis L."; "Protella phasma Mont."; "Ampelisca Gaimardii Kröy."; "Gammarus longimanus Leach."

Anhang I. Physikalische und faunistiche Untersuchungen in der Nordsee während des Sommers 1871, von A. Metzger in Hannover. pp. 165–176.

In this Appendix the Amphipoda are described on pages 173–174. They are fourteen in number. Among them is mentioned "*Kröyera arenaria* Sp. Bate." This is no doubt Spence Bate's *Kröyera arenaria*, which Boeck calls *Kröyeria arenaria*, and identifies with his *Pontocrates norvegicus*. "Atylus (Dexamine) Vedlomensis Bate and Westwood" was dredged "zwischen Helgoland und Spiekeroog." *Atylus falcatus* and *Siphonoecetes cuspidatus* are described as new species, but the descriptions had already appeared in 1871. See Note on Metzger under that date. It is here noted that "Lestrigonus Kinahani Bate," given as a separate species in the earlier list, must be referred as the male to "Hyperia Medusarum Müll. (= Hyp. Galba Montagu)." At page 176 a preliminary list is given of seven species of Amphipoda obtained by the "Pommerania" in the summer of 1872.

A translation of the paper above-mentioned by Karl Möbius, "On the invertebrate Animals of the Baltic," is given by Dallas in The Annals and Magazine of Natural History. No. 68. August 1873. Vol. XII. Fourth Series. London, 1873. pp. 81–89.

1873. Parfitt, Edward.

The Fauna of Devon. Part. IX. Sessile-eyed Crustacea (Read at Sidmouth, July, 1873.) Report and Transactions of the Devonshire Association for the advancement of Science, Literature and Art. Vol. VI. Part I. 1873. pp. 236–251.

The opening remarks include observations on the heart and circulation in *Niphargus aquilex*, Schiödte, in which, he says, "the pulsations of the heart are at the rate of 100 in fifty seconds." In the catalogue there are some remarks on the habits of *Corophium longicorne*, Latr. Eighty-two species of Amphipoda are named; some of the names, however, can only rank as synonyms.

1873. Thomson, Charles Wyville, born March 5, 1830, died March 10, 1882 (John Murray).

The Depths of the Sea. An account of the general results of the Dredging cruises of H.M.SS. "Porcupine" and "Lightning" during the summers of 1868, 1869, and 1870, under the scientific direction of Dr. Carpenter, F.R.S., J. Gwyn Jeffreys, F.R.S, and Dr. Wyville Thomson, F.R.S. 1873.

On page 125, *Eusirus cuspidatus*, Krøyer, is figured, and the remark made that it "had previously been known only in the Greenland seas," whereas this specimen was dredged on the third cruise of the "Porcupine" in 1869, among the fauna of the "Cold Area" in the channel between Færöe and Shetland. Fig. 19 is said to be "a large and hitherto unknown species of the genus *Caprella*." It is named *Caprella spinosissima*, Norman. But Mayer, Caprelliden, p. 35, quotes a letter from Norman saying that this was a mistake on Thomson's part. "It should have been *Caprella spinosissima*, Stimpson. It is = *Ægina echinata* of Boeck." Judging from a Spitzbergen specimen, which Norman sent as a female of the same species, Mayer inclined to regard the species as new, under the name *Ægina spinosissima*, Norman. This name, however, is preoccupied. The original specimen, which I have had an opportunity of seeing, confirms the view taken by G. O. Sars, 1885, that it is the same species as his *Caprella horrida*, and since the name *Caprella spinosissima* is preoccupied, *Caprella horrida* will be the name of the species. The remarkable resemblances between this species and *Ægina spinifera*, Bell, will easily account for any confusion that has arisen between them, in spite of their belonging to different genera.

1873. Wiedersheim, R.

Beiträge zur Kenntniss der württembergischen Höhlenfauna. Verhandlungen der physikalisch-medicinischen Gesellschaft in Würzburg. Neue Folge IV. Bd. pp. 207–222. [pp. 4, 5 of separate copy].

He records, according to Fries, the finding of an eyeless *Gammarus* on a stone of the brook at the entrance of the Falkenstein cavern, strikingly distinguished by its milk-white colouring from its brownish companions with well-developed eyes.

1873. Willemoes Suhm, Rudolph von, born September 11, 1847, died September 13, 1875 (John Murray).

"On a new genus of Amphipod Crustaceans." (March 6, 1873.) Proceedings of the Royal Society of London. Vol. XXI. London, MDCCCLXXIII. pp. 206–208.

The new genus *Thaumops* is thus defined:—

"Caput oblongum, inflatum, oculis maximis superiorem capitis partem tegentibus. Segmenta thoracica 6, abdominalia 5. Antennarum in feminis par unum, maxillarum par unum, pedum paria duo minima maxillarum locum tenentia. Mandibulæ nullæ. Pedes thoracici 5, abdominales 3 in quoque latere. Appendices caudales 4. Gangliorum pectoralium paria 5, abdominalium 3."

The type is given as "*Thaumops pellucida*, n. sp. Corpus longitudine 14 [84] mm., latitudine 21 mm., pellucidum."

The full description, with plates, was afterwards published in the Transactions, with various corrections, but both genus and species were, shortly after their institution, identified by their author with Guérin's "*Cystisoma Neptunus*." The "new family, Thaumopidæ, belonging to the tribe of *Hyperina*," which he here proposes to establish, was dropped, and a new family, Cystisomidæ, proposed. See Notes on Willemoes Suhm, 1874, 1875, 1879.

1874. Bos, Jan Ritzema.

Bijdrage tot de kennis van de Crustacea Hedriophthalmata van Nederland en zijne kusten. Groningen. 1874.

The introduction contains a short historical review of carcinology, and, among other points, suggests that the Hedriophthalmata, in spite of their comparatively small size, are the highest representatives of their class, on account of their dispensing with the nauplius- and zoëa-stages, on account of their including many terrestrial forms, and on account of their late appearance in the strata of the earth, the Podophthalmata having been met with as early as the carboniferous, the Hedriophthalmata not till the Jurassic period.

Descriptions are given of several well-known species, with interesting remarks upon them; the "calceolus" on the antennæ of *Gammarus pulex* is figured and discussed.

1874. Buchholz, Rudolf, died April 17, 1876 (Taschenberg).

Die zweite Deutsche Nordpolarfahrt in den Jahren 1869 und 1870 unter Führung des Kapitän Karl Koldewey. Zweiter Band. Wissenschaftliche Ergebnisse. Zoologie. Leipzig, 1874. pp. 262–270, 294–388—Pls. I.–XV.

This report opens with some occasional remarks on the appendages of the antennæ, the eyes, comparative measurements, and classification of Amphipoda.

Valuable remarks are made on the Lysianassidæ, with the species *Anonyx lagena*, Kr., properly *Anonyx nugax*, Phipps; *Anonyx littoralis*, Kr.; *Anonyx plautus*, Kr., for this and the preceding species the genus *Anonyx* being adopted in preference to *Onesimus*, Boeck; the Syrrhoinæ, species *Syrrhoë crenulata*, Goës; the Pardaliscinæ, species *Pardalisca cuspidata*, Kr., which, as well as most of the following, is fully described and strikingly figured; the Leucothoinæ, species *Eusirus cuspidatus*, Kr., *Amphithonotus aculeatus*, Lepechin, identified with *Tritropis helleri*, Boeck, as well as his *Tritropis aculeata*; *Tritropis* (*now Rhachotropis*)

fragilis, Goës; the Œdicerinæ, species *Œdiceros borealis*, Boeck, retransferred from *Monoculodes* to *Œdiceros*; *Œdiceros lynceus*, Sars; the Pleustinæ, a new family, species *Pleustes panoplus*, Kr.; *Parapleustes gracilis*, n. g. et s., perhaps the same as *Paramphithoë exigua*, Goës, and *Paramphithoë glabra*, Boeck: the Iphimedinæ, species *Vertumnus serratus*, Fabricius (of which the name *Vertumnus*, White, being preoccupied, has since been changed by Boeck to *Acanthonotozoma*); the Gammarinæ, species *Gammarus locusta*, L. (not figured), *Amathilla sabini*, Leach, *Amathilla pinguis*, Kr.; the Atylinæ, species *Atylus carinatus*, Fabricius, *Atylus smittii*, Goës (not figured), *Acanthozone hystrix*, Owen, probably, as Miers has pointed out, a new species, distinct from Owen's; *Paramphithoë inermis*, Kr.; *Paramphithoë fulvocincta*, Sars; *Paramphithoë megalops*, n. s.; the Ampeliscinæ, species *Ampelisca eschrichtii*, Kr., with the suggestion that *Ampelisca macrocephala*, Lilljeborg, may be only a local variety; the Podocerinæ, species *Podocerus anguipes*, Kr.; the Corophinæ, species *Glauconome leucopis*, Kr. (not figured); the Hyperidæ, species *Themisto libellula*, Mandt; the Caprellidæ, species *Ægina spinifera*, Bell, with which he identifies *Æginella echinata*, Boeck (the name *Æginella* being probably an accidental slip of the pen for *Ægina*).

The Syrrhoinæ are said to come near the Œdicerinæ in general form and in the structure of the mouth-organs, although having this distinction that only the left mandible is provided with a *processus accessorius*. (But this distinction is not universal in the group.)

In the Pardaliscinæ, Dr. Buchholz corrects the supposition of Boeck that a *processus accessorius* is wanting to the right mandible. He also considers that Bruzelius and Boeck have both of them confused the joints in the gnathopods of *Pardalisca cuspidata*, that which they have taken for the wrist being really the hand, and the finger being, contrary to the general rule in Amphipods, two-jointed. This would be extremely remarkable, and would contravene the rule well laid down by Spence Bate that in the Amphipoda the third (free) joint always underrides the fourth in the gnathopods and overrides it in the peræopods, but my own observation of members of the genus *Pardalisca* compels me to believe that the earlier authors are right, and Dr. Buchholz himself in error. It is in any case clear from the figures that Dr. Buchholz and Boeck are not referring to the same species under the title of *Pardalisca cuspidata*, Kr. The species so named by Buchholz agrees with *Pardalisca abyssi*, Boeck, a specimen of which was brought home by the Challenger and is figured in this Report..

From the Leucothoinæ, which he considers too heterogeneous a group, Dr. Buchholz is inclined to transfer the genus *Tritropis* (since called *Rhachotropis* by S. I. Smith) to the group containing *Paramphithoë*.

For the Pleustinæ, a new family, he mentions as characteristics, the antennæ rather short, the lower shorter than the upper (sexual differences not ascertained); the head small, with distinct, well-developed rostrum, the eyes small and lateral; the body frequently carinate, the first four side-plates well developed; the mandibles with broad dentate process but no molar tubercle; the gnathopods large, subchelate, the three last pairs of peræopods not much elongated, and the seventh not especially so; the uropods slender, pretty strongly elongated.

It is a little difficult to reconcile the expression "das gänzliche Fehlen des Kauhöckers der Mandibeln" in the above account of the family, with the description "des sehr verkümmerten Kauhöckers" of *Pleustes panoplus*. This degenerate molar tubercle is figured by Buchholz himself, as well as by Krøyer and Boeck.

The new genus *Parapleustes* is thus defined:—"Corpus epimeris quatuor anterioribus mediocribus, dorso rotundato epidermide tenui. Rostrum exiguum. Antennæ breves, inferiores [quam] superiores breviores. Mandibulæ processu dentali brevi, lato cum processu accessorio coalito, tuberculo molari nullo. Labium superius breve et latum, profunde emarginatum. Ceterum generi *Pleustes* valde affinis."

The differences in the mouth organs, the absence of a dorsal carina, and the very weakly developed rostrum are thought to justify the establishment of this new genus.

Among the Gammarinæ, a species taken by von Heuglin at Spitzbergen, is described in a supplementary note, p. 345, as being probably new and coming near to *Amathilla pinguis*. It is named "Amathilla Heuglini (Buchh.)." The diagnosis is as follows:—"Corpus sat altum, magnum, epidermide crassa, quasi loricatum, dorso rotundato lato, medio tumidum. Oculi nigri, mediocres, reniformes. Antennæ superiores inferioribus paullo breviores tertiam fere corporis longitudinem æquantes; flagello accessorio mediocri quatuor articulos præbente. Epimera anteriora mediocria, quartum multo latius, postice in spinam validissimam acutam horizontaleu productum. Epimera segmentorum abdominalium; secundum et tertium angulo posteriore in dentem acutum producta, primum rotundatum, tertium præterea in margine posteriore in dentem acutum sursum spectantem productum. Appendix caudalis elongata indivisa, apice incisura media perparva emarginatum. Pedes saltatorii tertii paris, ramis æqualibus compressis, anterioribus non longiores. Color pallide flavus. Long. total. 36 mm."

A full account, illustrated by numerous figures, is given of the differences between the young and adult forms of *Amathilla sabini* (*homari*, Fabr.). These, as Buchholz observes, had been already noted by Bruzelius, Skand. Amph. Gamm., p. 51. See also what is here said of *Grayia imbricata*, Spence Bate, p. 332.

Among the Atylinæ, the genus *Paramphithoë*, Bruzelius, is thus limited, to comprise—small, delicate Atylinæ, thin-coated, with slender bodies, very elongate filiform antennæ, slender, elongate feet, gnathopods with linear, weakly-developed, subchelate hands; back rounded, body compressed, rostrum very small; uropods very slender, elongate, the last pair with lanceolate compressed rami; the males uniformly possessing numerous specific appendages to the antennæ. The genus, besides including species assigned by Boeck to *Pontogeneia* and *Haliranes*, contains the new species *Paramphithoë megalops*, with the following diagnosis:—"Corpus parvum gracile, tenerum, dorso rotundato ubique inermi, oculis permagnis nigris, transversis, ovali-reniformibus, antennis perlongis, subæqualibus, longitudine totius animalis paullo brevioribus, pedum anteriorum manibus parvis ovatis; epimeris quatuor anterioribus parvis, illis segmentorum trium abdominalium primorum margine postico fortiter serrato dentatis; pedibus saltatoriis elongatis gracilibus. Longit. tot. ad 7^{mm}." The application of the term epimera to the *hind* margins of the first three pleon-segments cannot, I think, be justified.

In regard to the account given by Buchholz, pp. 375–377, of the Ampeliscinæ, Spence Bate, and the species, "*Ampelisca Eschrichtii*, Kröyer, Taf. XIII. Fig. 1," Metzger, in 1875 (p. 298, note), says of Buchholz's work, "Auf. p. 375 u. ff. ist *Ampelisca Eschrichti* zum Theil ziemlich ausführlich beschrieben und auf Taf. VIII. Fig. 1. durch Abbildungen erlautert. Beschreibung und Zeichnung weichen ebenfalls von Boeck's Diagnose in verschiedenen Punkten ab; leider hat ausserdem der Verfasser gewisse specifische Merkmale gänzlich unberücksichtigt gelassen, so dass ich in meiner Hoffnung, hiernach die Richtigkeit meiner Bestimmung zu prüfen, getäuscht wurde. Zunächst muss ich der Behauptung von Buchholz entschieden widersprechen, dass die beiden vorderen Fusspaare nur *einfache Krallenfüsse* seien mit nicht gegen das vorhergehende Glied zurückschlagbarer Kralle, ein Charakter, den Verfasser auf Grund dreier intersuchter Individuen sogar der ganzen Familie der Ampeliscinen vindicirt. Allerdings ist bei allen bis jetzt bekannten arten der Palmarrand nicht deutlich ausgeprägt und geht unmerklich in den Hinterrand über, nichts destoweniger kann aber die Kralle gegen diesen eingeschlagen werden; beide Glieder bilden also das, was man allgemein als manus subcheliformis zu bezeichnen pflegt.—In der Figur 1, Tab. XIII, hat das 7. Bein nur 5 Glieder! Die Contouren des oberen und hinteren Randes vom zweiten Gliede sind offenbar in der Zeichnung vergessen. Sodann ist auf die Beschaffen-

heit dieses Beines auch in der Beschreibung wenig Gewicht gelegt, obschon doch die Diagnosen von Boeck und die Beschreibungen von Bruzelius genugsam beweisen, wie dasselbe fast für alle Ampelisca-Arten gute specifische Merkmale darbietet; dafür ist die Bewaffnung des 6. Beines, Fig. 1*b*, vorzüglich detaillirt dargestellt, nur Schade, dass darin fast alle übrigen Arten bis auf geringe Dimensionsverhältnisse genau übereinstimmen. Spräche der Fundort nicht für Kroyer's Ampelisca Eschrichti, so könnte man nach der Abbildung unbedenklich auf die männliche Form von macrocephala schliessen. Die sexuellen Unterschiede der Ampeliscinen, über welche der Verfasser kurzweg als 'nicht bekannt' hinweggeht, sind von Lilljeborg und Bruzelius für macrocephala, lævigata und æquicornis ganz bestimmt angegeben." Buchholz says that his specimens were collected "zwei im Germania-Hafen, ein kleineres von Sabine-Insel 10 Faden."

1858–1874. Chenu and Desmarest, E.

L'Encyclopédie d'histoire naturelle. Crustacés—Mollusques—Zoophytes. Paris, 1858. Table Alphabétique des noms vulgaires et scientifiques de tous les sujets décrits et figurés dans cette encyclopédie. Crustacés, Mollusques et Zoophytes. Paris 1874.

In this work, which should rather have been mentioned under the earlier date, the Crustacea probably, and the Alphabetical Table certainly, should be ascribed to Desmarest alone. Accepting the "Édriophthalmes, Leach" as deuxième légion of the "Crustacés maxillés, Edwards," he makes the "Amphipodes, Latreille," the premier ordre, p. 46. All the species, he says, are very small, "car on n'en connait pas qui dépasse une longueur de 0 ,002." The "Première Famille, Crevettines, Latreille," includes two tribes. The first tribe has twelve genera assigned to it, the fifth being given as *Philius*, Guérin. Of *Gammarus*, the tenth, he says, "Le type est la Crevette des ruisseaux ou Chevrette (*Gammarus fluviatilis*, Edw.). Longueur, 0m,010 à 0m,015." "Fig. 27.—Crevette des ruisseaux" has a perfectly smooth back; nevertheless the text says, p. 48, "une espèce que l'on confond souvent avec la Crevette des ruisseaux, ayant les mêmes mœurs, se trouvant dans les mêmes lieux, et n'en différant guère que parce que son abdomen est lisse, est la Crevette puce (*Gammarus pulex*, Fabr.)" The second tribe has seven genera, the third being thus given, "*Cesapodina*, Templeton (C. obdita, trouvée en mer)."

The "Deuxième Famille, Hypérines, Edwards," includes three tribes, the first being "Hypérines grammaroides," with one genus; the second, "Hypérines ordinaires" has thirteen genera, among which it may be noted that *Lanceola* is kept distinct from *Hyperia;* to the seventh "*Lestrigonus*, Edw.," *L. Fabricii*" is assigned as the type; *Anchylomera* is the ninth, and its synonym *Hieraconyx* the tenth, while the thirteenth is "Sperchius, Leach," *Sperchius* being, in fact, an obscure genus instituted by Rafinesque. The third tribe, "Hypérines anomales," receives four genera, the second being given as "*Orione*, Cocco," by a substitution of the Italian for the Latin name *Orio*.

"The "Deuxième ordre, Lœmodipodes, Latreille" is said to correspond with the "genre *Cyame* de De Lamarck," and contains two families, the first Caprelliens, with three genera, *Caprella*, *Leptomera* and *Naupridia;* the second Cyamiens, with the one genus, *Cyamus*.

In the Alphabetical Table *Phlias*, *Cerapodina abdita*, *Hypérines gammaroides* and *Lœmodipodes* are given correctly; "*L. Fabricia*" becomes *Lestrigone Fabrcii*." The preface (avis), dated "15 octobre 1858," thinks that the table, like the body of the work, will be "d'un très-grand secours pour les recherches des naturalistes et des gens du monde." Yet in 1858 no notice had been taken of Dana's researches, and in 1874 no hint is given that carcinology had made any advance in the preceding sixteen years.

1874. Dybowsky (Duibovsky), Benedict N.

Beiträge zur näheren Kenntniss der in dem Baikal-See vorkommenden niederen Krebse aus der Gruppe der Gammariden. Herausgegeben von der Russischen Entomologischen Gesellschaft zu St Petersburg. Beiheft zum X Bande der Horae Societatis Entomologicae Rossicae. Mit 3 colorirten und 11 schwarzen Tafeln. St Petersburg, 1874.

In the Preface, he mentions *Piscicola torquata*, Grube, as a parasite on the branchial plates of species of Gammarus.

In the Introduction, he says that the Crustacean fauna of Lake Baikal consists mainly of Amphipoda, all belonging to the *Gammarina*. Between "*Gammarus Petersii*, with slender body, long extremities and extremely long antennæ, and on the other side *Gammarus inflatus*, with short thick body, short extremities and short antennæ," he finds so many gradations of form and combinations of likeness and difference, that he cannot venture under existing circumstances on separating more than a single species from the genus *Gammarus*. This one species he places in a new genus, *Constantia*, a name unfortunately preoccupied among Mollusca in 1860. The accidental misspelling *Costantia* had therefore better be adopted for this genus.

A full table of terminology is given, in which the homologous joints of the appendages receive a needlessly great variety of names.

General remarks on the genus *Gammarus*, Fabr., are concluded by the following diagnosis of it, as applicable to the species from Lake Baikal :—

"Die Fühler sind als Gefühlsorgane ausgebildet; an den Stielgliedern kommen nämlich einzelne Fiederborsten, an den Geisselgliedern der oberen Fühler *Leydig*'sche cylinder und an den Geisselgliedern der unteren Fühler oft *Lavalett*'sche Kolbenorgane vor. Die Stiele der oberen und der unteren Fühler sind immer länger als das Kopfsegment, Die Nebengeissel ist immer vorhanden, sie ist 1–40gliedrig. Die Geissel der oberen Fühler ist immer länger als ihr Stiel. Der Richeonus [Riecheonus] endet mit einem cylinderförmigen Röhrchen. Die Seitenplatten der Rumpfsegmente tragen oft an ihren unteren Rändern einfache Borsten, nie Fiederborsten. Die Oberkieferbeine haben 4gliedrige Taster. Die Basalglieder der Hand und Afterhandbeine sind cylindrisch, schmal, nicht erweitert. Die Hände haben eine deutliche Palmarrinne. Die Basalglieder der Gangbeine sind meist erweitert, oft mit langen einfachen Borsten am Hinter-rande besetzt, nie mit Fiederborsten. Der Schwanzanhang ist zweitheilig oder einfach. Die Steuerbeine sind einblättrig oder zweiblattrig. Die Thiere dieser Gattung sind eigentlich Grundthiere, welche sich nie weit von dem Boden entfernen." The two gnathopods are called Handbeine; the first two peræopods Afterhandbeine; the last three Gangbeine; the pleopods Schwimmbeine; the first and second uropods Springbeine; the third uropods Steuerbeine; the telson Schwanzanhang.

The species are grouped into two sections, with numerous divisions and subdivisions, and are thus numbered and named in the preliminary review:—"Erste Abtheilung. Die Nebengeissel vielgliedrig: zwei- bis vierzig-gliedrig." 1. *G. Flori*, n. s.; 2. *G. Flori* var. *albula*, n.; 3. *G. calcaratus*, n. s., Taf. vii, Fig. 4; 4. *G. margaritaceus*, n. s.; 5. *G. Kietlinskii*, n. s., Taf. i, Fig. 1; 6. *G. Stanislavi*, n. s.; 7. *G. pulex*, De Geer, Taf. viii, Fig. 1; 8. *G. testaceus*, n. s.; 9. *G. Sophiæ*, n. s.; 10. *G. fuscus*, n. s., Taf. v, Fig. 2; 11. *G. murinus*, n. s., Taf. v, Fig. 1; 12. *G. ahenens*, n. s., Taf. vii, Fig. 2; 13. *G. verrucosus*, Gerstf., Taf. iv, fig. 1; 14. *G. viridus*, n. s., Taf. vi, Fig. 1; 15. *G. hyacinthinus*, n. s.; 16. *G. albinus*, n. s., Taf. ix, Fig. 3; 17. *G. flavus*, n. s., Taf. ix, Fig. 1; [misprinted Taf. xi, Fig. 1, in the general account]; 18. *G. carneolus*, n. s.; 19. *G. amethystinus*, n. s., Taf. ix,

Fig. 6; 20. *G. violaceus*, n. s., Taf. x, Fig. 3; 21. *G. toxophthalmus*, n. s.; 22. *G. ibex*, n. s.; 23. *G. longicornis*, n. s. [a preoccupied name]; 24. *G. longicornis*, var. *polyarthrus*, n., Taf. x, Fig. 2. b', c'.; 25. *G. Parcevii*, n. s., Taf. x, Fig. 2; 26. *G. rittatus*, n. s.; 27. *G. Petersii*, n. s., Taf. x, Fig. 1; 28. *G. leptocerus*, n. s., Taf. viii, Fig. 2; 29. *G. leptocerus* var. *acutocerus*, n., Taf. viii. Fig. 3; 30. *G. Sarmatus*, n. s., Taf. i, Fig. 3. Taf. viii, Fig. 4; 31. *G. capreolus*, n. s., Taf. xi, Fig. 1; 32. *G. Ussolzevii*, n. s., Taf. ix, Fig. 2 (in the full account given as *G. Ussolzewii*, with a note, "wird gelesen Ussoltzewii"); 33. *G. Ussolzevii* var. *abyssorum*, n.; 34. *G. stenophthalmus*, n. s.; 35. *G. schamanensis*, n. s.; 36. *G. cyaneus*, n. s.; 37. *G. Czerskii*, n. s., Taf. i, Fig. 2. Taf. iii, Fig. 8 [note "wird Tscherskii gelesen"]; 38. *G. viridis*, n. s., Taf. vi, Fig. 2; 39. *G. viridis* var. *canus*, n., Taf. v, Fig. 3. Taf. iv, Fig. 4; 40. *G. viridis* var. *olivaceus*, n.; 41. *G. Maackii*, Gerstf.; 42. *G. saphirinus*, n. s.; 43. *G. capellus*, n. s.; 44. *G. Sophianosii*, Taf. x, Fig. 4; 45. *G. Sophianosii* var. *Scirtes*, n., Taf. xi, Fig. 2; 46. *G. bifasciatus*, n. s., Taf. xii, Fig. 6; 47. *G. pictus*, n. s., Taf. xii, Fig. 3; 48. *G. pictus*, var. *α*, n.; 49. *G. pictus* var. *β*, n., Taf. xii, Fig. 2; 50. *G. orchestes*, n. s.; 51. *G. talitrus*, n. s., Taf. xi, Fig. 5; 52. *G. araneolus*, n. s., Taf. xi, Fig. 3; 53. *G. araneolus* var. *quinquefasciatus*, n., Taf. xi, Fig. 7; 54. *G. araneolus*, var. *ophippiatus*, n., Taf. xi, Fig. 8; 55. *G. Gerstaeckeri*, n. s., Taf. xiv, Fig. 5; 56. *G. ignotus*, n. s., Taf. iv, Fig. 3; 57. *G. branchialis*, n. s., Taf. xiv, Fig. 4; 58. *G. Strauchii*, n. s., Taf. xii, Fig. 4; 59. *G. Carpenterii*, n. s., Taf. xiii, Fig. 2; 60. *G. cinnamomeus*, n. s., Taf. vii, Fig. 3; 61. *G. rhodophthalmus*, n. s., Taf. xiv, Fig. 10; 62. *G. rhodophthalmus* var. *microphthalmus*, n.; 63. *G. pulchellus*, n. s., Taf. v, Fig. 4; 64. *G. Seidlitzii*, n. s., Taf. v, Fig. 5; 65. *G. Wagii*, n. s., Taf. i, Fig. 4; 66. *G. Cabanisii*, n. s., Taf. xiii, fig. 5; 67. *G. Zienkowiczii*, n. s., Taf. iii, Fig. 5; 68. *G. Reissnerii*, n. s., Taf. iii, Fig. 1. Taf. iv, Fig. 7; 69. *G. cancellus*, Pall.; 70. *G. cancellus* var. *Gerstfeldtii*, n., Taf. ii, Fig. 1; 71. *G. cancelloides*, Gerstf., Taf. xiii, Fig. 6; 72. *G. Grubii*, n. s., Taf. i. Fig. 5; 73. *G. Kesslerii*, n. s., Taf. i, Fig. 7; 74. *G. Kesslerii* var *europæus* Kessl.; 75. *G. Brandtii*, n. s., Taf. xiv, Fig. 1; 76. *G. Lovenii*, n. s., Taf. xiii. Fig. 7; 77. *G. Borowskii*, n. s., Taf. ii, Fig. 3; 78. *G. Borowskii* var. *dichrous*, n.; 79. *G. Borowskii* var. *abyssalis*, n.; 80. *G. Łagowskii*, n. s., Taf. ii, Fig. 2; 81. *G. Puzyllii*, n. s., Taf. iii, Fig. 4; 82. *G. Godlewskii*, n. s., Taf. i, Fig. 6; 83. *G. Godlewskii* var. *Victorii*, n. s.; 84. *G. armatus*, n. s., Taf. xii, Fig. 1; 85. *G. parasiticus*, n. s., Taf. iii, Fig. 3; 86. *G. Radoszkowskii*, n. s., Taf. xiii, Fig. 3; 87. *G. Grewingkii*, n. s., Taf. ii, Fig. 4; 88. *G. Reichertii*, n. s., Taf. xiii, Fig. 4; 89. *G. Solskii*, n. s., Taf iii, Fig. 2.

"Zweite Abtheilung. Die Nebengeissel eingliedrig."

90. *G. Czyrniańskii*, n. s., Taf. ix, Fig. 5; 91. *G. asper*, n. s., Taf. xiii, Fig. 1 (name preoccupied); 92. *G. Taczanowskii*, n. s., Taf. xiv, Fig. 9; 93. *G. latior*, n. s., Taf. iv, Fig. 6; 94. *G. latus*, n. s., Taf. iv, Fig. 5; 95. *G. latissimus*, Gerstf. (described from Gerstfeldt, Dybowsky himself not having found it in Lake Baikal); 96. *G. tuberculatus*, n. s.; 97. *G. Morawitzii*, n. s.; 98. *G. smaragdinus*, n. s., Taf. xi, Fig. 6; 99. *G. smaragdinus* var. *intermedius*, n.; 100. *G. zebra*, n. s., Taf. xiv, Fig. 7 (name preoccupied); 101. *G. littoralis*, n. s., Taf. xiv, Fig. 2; 102. *G. inflatus*, n. s., Taf. xii, Fig. 4; 103. *G. pullus*, n. s., Taf. xi, Fig. 4; 104. *G. talitroides*, n. s., Taf. xiv, Fig. 3; 105. *G. Firsenii*, n. s.; 106. *G. rugosus*, n. s. Taf. xiv, Fig. 8; 107. *G. puella*, n. s.; 108. *G. glaber*, n. s., Taf. xiv, Fig. 6 (name preoccupied); 109. *G. vorter*, n. s., Taf. ix, Fig. 4; 110. *G. Wahlii*, n. s.; 111. *G. Wahlii* var. *platycercus*, n.; 112. *G. Klukii*, n. s.; 113. *G. pachytus*, n. s.; 114. *G. pachytus* var. *dilatatus*, n.; 115. *G. perla*, n. s.

Of the new genus *Constantia* (*Costantia*), the following diagnosis is given:—"Die beiden Fühlerpaare sind zu Locomotionsorganen umgewandelt, die oberen Fühler sind mächtiger und länger als die unteren. Die beiden Endglieder der oberen Stiele etwas flach gedrückt, ihr Innenrand mit einem dichten bürstenförmigen Borstenbesatze versehen. Die Geissel-

glieder beider Fühlerpaare tragen aussen und innen gleich lange, steife, einfache Borsten, was ihnen eine Aehnlichkeit mit einer Federfahne verleiht. Die Nebengeissel fehlt, der Leydig'sche Cylinder, die Lavalett'schen Kolbenorgane und die Stäbchenorgane nicht vorhanden. Der Riechconus mit einem Endcylinder. Die Augen seitlich gestellt, flach. Die Oberkiefer mit dreigliedrigen, stark entwickelten Tastern, die Unterkiefer mit zweigliedrigen, die Unterlippen mit eingliedrigen, die Unterkieferbeine mit viergliedrigen Tastern versehen. Der Körper schwach seitlich zusammengedrückt. Der Schwanztheil stark entwickelt. Der Schwanzanhang lang, zwei-theilig. Die Seitenplatten klein, niedrig, ohne Borsten. Alle Beine sind zart und lang, besonders aber das zweite Paar der Gangbeine und das vordere Paar der Springbeine. Die Hände haben eine sehr schwach angedeutete Palmarrinne. Die Basalglieder der Gangbeine schmal. Das innere Scheerenglied der hinteren Springbeine und die beiden langen Blätter der Steuerbeine sind mit langen und kräftigen Fiederborsten bewachsen."

The type species is named "*Constantia Branickii*," n. s., Taf. iii, Fig. 7; var. *Alexandri*, Taf. iii, Fig. 6, is only distinguished by the greatly developed dorsal spine-process on the first pleon-segment.

1874. Grenacher, H.

Göttinger Nachrichten. N^r 26. 1874.

See Note on Grenacher, 1879.

1874. Hoffmann, C. K.

Recherches sur la Faune de Madagascar et de ses dépendances, d'après les découvertes de François P. L. Pollen et D. C. van Dam. 5me Partie. 2me Livraison. Crustacés et Echinodermes par C. K. Hoffmann. Leyde, 1874.

In the "Enumeration des Crustacés trouvés à Madagascar et les Mascareignes," pp. 37–44, he mentions as Amphipoda, "Gammaridæ. 168. Amphithoë costata Milne Edwards. Réunion. Hyperina. 169. Anchylomera Hunteri Milne Edwards. Réunion," and as Læmodipoda, "Caprellidæ. 170. Caprella scaura Templ. Mauritius. 171. Caprella nodosa Templ. Mauritius. 172. Caprella megacephala Milne Edwards. Cap. St. Marie (Madagascar)."

1874. Humbert, Alois.

Die Falkensteiner Höhle, ihre Fauna und Flora. Jahreshefte des Vereins für vaterländische Naturkunde in Württemberg. 30 Jahrg. 1874. pp. 86-163.

Gammarus puteanus is recorded on p. 114; lists of species from other caves are also given.

1874. Macdonald, John Denis.

"On the Anatomy and Habits of the genus *Phronima* (Latr.)." (Read February 5, 1874.) Proceedings of Royal Society of London. Vol. XXII. London, MDCCCLXXIV. pp. 154–158. Pl. I.

A description and figures are given of "a species of *Phronima* captured in lat. 30° 16′ S., long. 176° 27′ W."

1874. M'Intosh, William Carmichael.

On the Invertebrate Marine Fauna and Tides of St. Andrews. The Annals and Magazine of Natural History. No. 82. October 1874. Vol. XIV. Fourth Series. London, 1874. pp. 258–274. Also published separately.

The habits and special habitats of some of the sessile-eyed Crustacea are noticed. Acknowledgment is made to Mr. Spence Bate and the Rev. A. M. Norman for assistance in determining doubtful forms. In the list of Amphipoda, *Allorchestes nilssonii* of Bate and Westwood is transferred to "*Hyale Nilssoni*, H. Rathke;" the species *monoculoides*, Mont., *marina*, "*Alderi*," *pellexiana*, *clypeata*, assigned to *Montagua* by Bate and Westwood, are here referred to *Stenothoë*, Dana; their *Anonyx denticulatus* to *Anonyx hollöllii*, Kröyer, their *Ampelisca gaimardii* to *Ampelisca carinata*, Bruzelius, their *Ampelisca belliana* to (= *A. macrocephala*, Lilljeborg?). "*Calliopius bidentatus* (n. sp.), Norman, Nat. Hist. Trans. Northumb. & Durham, vol. i. 1865, p. 24," said by Mr. Norman to be not uncommon all along the east coast, is thus described :—"The body is about two-fifths of an inch long, of a pale straw colour, tinted with brownish at the joints and the bases of the limbs. Superior antennæ twice as long as the inferior, beautifully banded with red. Eyes irregularly rounded, brownish red or pale brick-red. The first and second gnathopods are nearly equal (the second, however, being larger) and similar in structure. Hand almond-shaped, the palm being furnished with a series of very distinct stout spines, and a row of smaller spines reaching the base of the finger; the latter is long, boldly curved, and regularly divided on the concave side. The first and second pleopods [? pleon-segments] have spines, that of the former, however, being sometimes indistinct. A very characteristic convexity occurs at the junction of the third and fourth pleopods [? pleon-segments]; and the dorsal margin of the latter is concave."

Eiseladus longicaudatus of Bate and Westwood is here given as *Heiseladius longicaudatus*, their *Amphithoë littorina* as *Amphithoë podoceroides*, H. Rathke, and distinct from *Amphithoë rubricata*, Mont. "Most of the fine specimens," it is said, "have the hand of the second pair defined by a distinct tooth, as Rathke and Dr. Johnson state." *Podocerus falcatus*, Mont., is given as including *Podocerus pulchellus* and *Podocerus pelagicus* of Bate and Westwood, *Podocerus variegatus*, Leach, as including their *Podocerus capillatus*. "Siphonœcetus Whitei," Gosse, is said to be probably the female of "Siphonœcetus typicus," Kröyer. The three species, *tuberculosa*, *rimapalmata* and *excavata*, assigned by Bate to *Nænia*, are all recorded as found together in the "débris from the coralline ground." *Hyperia medusarum*, O. F. Müller, is given as including *Hyperia galba* of Bate and Westwood, with the remarks "The *Lestrigonus Kinahani*, Bate, is a sexual variety (male). Some large specimens are found swimming freely on the surface of the water." "*Ægina plasma*, Mont.; B. & W. *op. cit.* ii. p. 45," appears without notice that the authors quoted do not assign it to *Ægina*. "*Caprella tuberculata*, Guérin; B. & W. *op. cit.* ii. p. 68," is said to be common on *Ceramium rubrum* in rock-pools, and in the stomachs of cod and haddock. Mr. Norman's opinion is given that the *Caprella hystrix* of Bate and Westwood is not the *Caprella hystrix* of Kröyer, but rather is *Caprella septentrionalis*. The list includes several other Amphipoda, with occasional notes on colouring.

1874. Marion, Antoine Fortuné.

Recherches sur les animaux inférieurs du golfe de Marseille. Description des Crustacés Amphipodes parasites des Salpes. Annales des Sciences nat., 6 sér. Zool. et Paléont. Tome I. Article No. 1. Paris. 1874. pp. 1–19. Pls. 1, 2.

The Salpæ are, he says, extremely abundant in some years, and then may not reappear during several springs. They were found in long chains in 1869, with *Salpa maxima* predominant, which he never took without finding upon it the parasitic Amphipods which he here describes. The first is *Vibilia jeangerardii*, Lucas, 1849, of which he considers *Vibilia speciosa*, Costa, 1853, and *Vibilia mediterranea*, Claus, Grundzüge der Zoologie, 2d Ed., to be in all probability synonyms. In describing the maxillipeds, "la lèvre inférieure, constituée par la réunion des deux *stigonopodes* de la troisième paire, appelés souvent pattes-mâchoires," he remarks, "il est très-important de constater que cette lèvre sternale est totalement dépourvue d'appendices palpiformes, tandis que M. Milne Edwards décrit et figure chez le *Vibilia Peronii* deux petites tiges rudimentaires représentant ces organes développés dans les Gammarines." Secondly, *Lycæa pulex*, n. s., is figured and very fully described. It is compared with *Lycæa ochracea*, Dana. G. O. Sars in 1882 considers that it comes very near the northern species *Lycæa* (*Tryphana*) *malmii*, Boeck. Claus in 1879 establishes *Lycæa robusta*, n. s., but gives as a synonym "*L. pulex* Marion? . . . Junges ♂."

1874. Martens, Eduard von.

Crustacea. The Zoological Record for 1872; being Volume Ninth of the Record of Zoological Literature. London, M.DCCC.LXXIV. pp. 185–204.

1874. Smith, S. I., and Harger, Oscar.

Report on the Dredgings in the region of St. George's Banks, in 1872. From the Transactions of the Connecticut Academy of Arts and Sciences, Vol. III, Part I, 1874.

Lists are given of the Crustacea taken at the various localities in which dredging was carried on. "*Notes on some of the Species enumerated;* by S. I. Smith," include remarks on the following Amphipoda, pages 29 to 35; "*Phoxus Kroyeri*, Stimpson," "very closely allied to, and probably identical with, the *P. Holbollii* Kroyer which is found in Greenland, Iceland and northern Scandinavia;" *Harpina fusiformis*, Smith (*Phoxus fusiformis*, Stimpson), "this species is very likely identical with the *H. plumosa* Boeck (*Phoxus plumosus* Kroyer), which has very nearly the same range as *Phoxus Holbollii*;" *Stenothoë peltata*, Smith, n. s., Pl. IV [III], figs. 5–8; *Syrrhoë crenulata*, Goës, "seems to be an exceedingly arctic form, being found in Europe from Spitzbergen to the western coast of Norway;" *Tiron acanthurus*, Lilljeborg (*Syrrhoë bicuspis*, Goës; *? Thessarops* [*Tessarops*] *hastata*, Norman); *Œdiceros lynceus*, Sars (*Œdiceros propinquus*, Goës; *Monoculodes nubilus*, Packard, Mem. Boston Soc. Nat. Hist. i. p. 398, 1867); *Monoculodes borealis*, Boeck (*Œdiceros affinis*, Goës); *Paramphithoe pulchella*, Bruzelius (*Kroyer* sp.); *Paramphithoe cataphracta*, (*Amphithonotus cataphractus*, Stimpson), "this species is apparently a true *Paramphithoë*, as restricted by Boeck, and closely allied to, if not identical with, *P. panopla* Bruzelius (*Amphithoë panopla* Kroyer). Boeck places *Pleustes tuberculatus* Bate as a

synonym of Kroyer's species, and if he is correct in this our species is undoubtedly distinct": *Verturmnus serratus?*, Goës (Fabricius sp.), (*Acanthonotus serratus*, Stimpson), "Our specimens all differ from the descriptions and figures given by Boeck and Kroyer in the armature of the posterior margin of the third segment of the abdomen. In our specimens the upper process from this margin is armed with four or five teeth above and at the tip, while the lower process is armed with five or six teeth similarly situated, but with no teeth on the lower margin except just at the tip. In Kroyer's figure (Grönlands Amfipoder, plate ii. figure 8) the upper process is represented as terminating in a single tooth and the lower process as toothed along both sides; Boeck's description agrees with this, except that he says there are two teeth at the tip of the upper process"; Boeck afterwards changed the name to *Acanthonotozoma serratum*; *Acanthozone cuspidata*, Boeck; *Byblis gaimardi*, Boeck (Kroyer sp.), "the *Ampelisca Gaimardi* of Bate, and Bate and Westwood, is not this species, but a true *Ampelisca*. All the species of this subfamily are undoubtedly tube-dwellers. . . . In this species, the glands which secrete the cementing fluid are situated principally in the meral and basal segments of the third and fourth pairs of thoracic legs;" *Xenoclea megachir*, Smith, n. s., Pl. IV [III], figures 1 to 4. "'Pedes 3tii et 4ti paris articulo Imo latissimo' of the generic description would scarcely apply to our species, but in all the other generic characters it agrees perfectly, as it does also with the diagnosis of the subfamily Photinæ, except that the mandibles each bear six serrated spines instead of the usual number, four." In this species Professor Smith noticed a peculiar "glandular structure filling a large portion of the third and fourth pairs of thoracic legs." "The terminal segment (dactylus) in these legs is not acute and claw-like, but truncated at the tip and apparently tubular." "A large cylindrical portion of the gland lies along each side of the long basal segment, and these two portions uniting at the distal end pass through the ischial and along the posterior side of the meral and carpal segments, and doubtless connect with the tubular dactylus. There can be no doubt that these are the glands which secrete the cement with which the tubes are built, and that these two pairs of legs are specialized for that purpose." In *Amphithoë maculata* the gland is in the middle of the basal segment. Other arrangements with reference to this gland are mentioned for *Cerapus rubricornis*, *Ptilocheirus pinguis*, *Byblis gaimardi*, and a species of *Ampelisca*.

1874. SMITH, S. I.

Tube-building Amphipoda. The Annals and Magazine of Natural History. No. 81. September 1874. Vol. XIV. Fourth Series. London, 1874. p. 240. Silliman's American Journal, June, 1874.

The cement-glands are described in *Xenoclea* sp., and noted in *Amphithoë maculata*, *Ptilocheirus pinguis*, *Cerapus rubricornis*, *Byblis gaimardi*, *Ampelisca* sp. In the *Cerapus* "the orifice in the dactylus is not at the very tip, but subterminal on the posterior side." In *Ampelisca* and *Byblis* "the remarkable elongation of the two distal segments in the third and fourth pairs of legs is perhaps a special adaptation to enable them to reach back over the deep epimera." See Note on Smith and Harger, 1874.

1874. SMITH, S. I.

The Crustacea of the fresh waters of the United States. pp. 637–661. Sketch of the Invertebrate Fauna of Lake Superior. pp. 690–706. Food of fresh-water fishes. pp. 708–709. Extract from the report of Prof. S. F. Baird, Commissioner of fish and fisheries, Part II, Report for 1872–'73. Washington, 1874.

At page 645, the account of the Amphipoda begins with the family ORCHESTIDÆ, and the new genus *Hyalella*, thus described:—

"First pair of maxillæ with rudimentary, very short, and uniarticulate palpi. Palpus of the maxillipeds composed of five segments; the terminal segment being slender and styliform, and the penultimate broad. Antennulæ, antennæ, and thoracic legs much as in *Hyale*. Telson short, stout, and entire.

"This genus seems to be closely allied to *Hyale*, but differs from it and from the rest of the *Orchestidæ* in the palpus of maxillipeds, which has five instead of four segments, showing in this respect a remarkable approach toward the gammaroid group of *Amphipoda*. From *Hyale* it differs also in the telson."

For a discussion of the genera *Hyale* and *Hyalella*, see Note on Rathke, 1837. *Hyalella dentata*, n. s., pl. ii. figs. 8–10, is here described. After the description had been sent to the printer, Professor Smith received many additional specimens from Lake Okeechobee, Florida. In some of these, he says, "the dorsal teeth upon the first and second segments of the abdomen are very small; and, in a very few specimens, they are wholly, or almost wholly, wanting." The *Amphithoë azteca*, Saussure, "undoubtedly belongs to this genus, and may be called *Hyalella azteca*." *Allorchestes knickerbockeri* of Bate "belongs probably to this genus"; "the palpus of the first pair of maxillæ, in Bate's species, is figured (perhaps incorrectly) as composed of two segments."

In the family LYSIANASSIDÆ, "*Pontoporeia Hoyi*," pl. ii, fig. 5, is entered as a new species, with the synonymy, "*Pontoporeia affinis* Smith, American Journal of Science, 3d series, vol. ii, p. 452, 1871; and Preliminary Report on Dredging in Lake Superior, p. 1022, 1871. *Gammarus Hoyi* Stimpson, MSS., (full-grown male form.) *Gammarus brevistylis* Stimpson, MSS., (female)." Professor Smith had originally regarded his specimens "as specifically identical with the *Pontoporeia affinis* of the Scandinavian lakes and the Baltic. A subsequent and more minute comparison has, however, revealed some differences, which are apparently constant." "The most remarkable differences are in the peculiar, elongated, papilliform appendages upon the sternal portion of the thoracic segments." These, it appears, are more numerous in the American specimens than in the European, as described by G. O. Sars in 1867. A second new species, *Pontoporeia filicornis* (*Gammarus filicornis* Stimpson, MSS.), is founded on a single specimen. "This species differs remarkably from all the heretofore known species of *Pontoporeiæ* in the excessive elongation of the flagella of the antennulæ and antennæ, a character which might be regarded by some naturalists as of generic value. The very close agreement with *P. affinis* and *Hoyi* in all other parts of the animal, however, seems to indicate a very close affinity with those species, especially the latter; and as this one peculiarity is very likely only a sexual character of the old males of the species, I retain the species in the genus." The detailed account seems to make it doubtful whether the name *Pontoporeia affinis* would not suffice both for this and the preceding species.

In the family GAMMARIDÆ, is described *Gammarus limnæus*, Smith, pl. ii, figs. 6, 7, (*Gammarus lacustris*, Smith, 1871), "this species is very closely allied to the *Gammarus neglectus* of G. O. Sars, which inhabits the lakes of Norway," of which *lacustris* is a synonym, or

perhaps rather the rightful name, and from which Professor Smith says that his species, though differing only in minor details, is undoubtedly entitled to be considered distinct. Very large specimens had been obtained in Colorado, from an elevation of 9000 feet. He next describes *Gammarus fasciatus*, Say. Of *Gammarus minus*, Say, he remarks that he has "not yet been able to rediscover this species, which is very likely not a true *Gammarus*." The *Gammarus minus* of De Kay, he says, "is made up principally of Say's original description," with a "rude attempt at a figure" apparently from some other species, probably *Gammarus fasciatus*. He describes both sexes of *Crangonyx gracilis*, Smith, 1871, and mentions *Crangonyx vitreus*, Packard, 1873, giving under protest as a synonym, "*?? Stygobromus vitreus* Cope, American Naturalist, vol. vi, p. 422, 1872; Third and Fourth Annual Reports of the Geological Survey of Indiana, p. 181, 1872." He describes *Crangonyx tenuis*, n. s., "a slender, elongated species, with very low epimera, resembling more in form the species of *Niphargus* than the typical species of *Crangonyx*."

In the "Sketch of the Invertebrate Fauna of Lake Superior," four Amphipoda are mentioned, *Hyalella dentata*, "*Pontoporeia Hoyi*," *Gammarus limnæus*, *Crangonyx gracilis*, with references to the descriptions already given.

In the Section on the "Food of Fresh-water Fishes," "*Pontoporeia Hoyi*," is mentioned as found in the stomach of the White-fish (*Coregonus albus*), at various stations.

1874. Stebbing, Thomas Roscoe Rede, born February 6, 1835.

Amphipodous Crustacea. A new species, and some items of description and nomenclature. The Annals and Magazine of Natural History, July 1874. Ser. 4. Vol. 14. London, 1874. pp. 10–15. Pls. I. II.

"*Liljeborgia Normanni*" is described and figured as a new species, near to *Liljeborgia shetlandica*, Bate and Westwood, both species being synonyms of *Cheirocratus sundevalli*, Rathke. A variety of *Iphimedia eblanæ* is described and figured, as intermediate between that species and *Iphimedia obesa*, with the suggestion that distinction implied by the two specific names may, in fact, be one of sex. The male of *Microdeutopus versiculatus*, Sp. Bate, is figured and discussed. This species, in Boeck's opinion, may be the same as *Autonoë longipes*, Lilljeborg, but the first gnathopods do not suit that view. The alteration of *Microdeutopus* to *Microdeuteropus*, accepted in this paper, I no longer think necessary. *Microprotopus maculatus*, Norman, is figured, and some notes are given on that species. *Gammarella brevicaudata*, ♀, Milne-Edwards, is figured and discussed to show that "*Gammarella Normanni*," Bate and Westwood, is in fact the female of Milne-Edwards' species. This had been already suggested by Mr. Spence Bate in the Brit. Mus. Catal., p. 379.

1874. Stebbing, T. R. R.

On some species of *Amphithoë* and *Sunamphithoë*. The Annals and Magazine of Natural History, for August 1874. Ser. 4. Vol. 14. Pls. XI. XII. pp. 111–118.

Amphithoë cuniculus, n. sp., is described and figured. *Amphithoë rubricata*, Montagu, is compared with *Amphithoë littorina*, Sp. Bate, and the inference drawn that they are varieties only of the same species. *Amphithoë littorina* is by Boeck identified with *Amphithoë podoceroides*, Rathke, but Montagu's name being still older will take

precedence. Figures and descriptions are given of both sexes of *Sunamphithoë gammaroides*. This I believe to be identical with the partially described *Amphithoë gammaroides* of Spence Bate. Both sexes are described of *Sunamphithoë conformata*, Sp. Bate, with the suggestion that *Sunamphithoë hamulus*, Sp. Bate, is in fact not a separate species, but the female of *Sunamphithoë conformata*. The name of the species, however, should be *hamulus*, although the synonymy, as given both in the Brit. Mus. Catal. and in the Sessile-eyed Crustacea, leads to the (erroneous) inference that *conformata* was the earlier established. As a matter of fact *hamulus* stands first at the original contemporary institution of the two names.

1874. Stebbing, T. R. R.

The sessile-eyed Crustacea of Devon. (Read at Teignmouth, July, 1874.) The Transactions of the Devonshire Association for the Advancement of Science, Literature and Art. Vol. VI. Part II. Plymouth, 1874. pp. 764–773, with plate.

No new species are described in this paper, which was intended as a supplement to Mr. Parfitt's Catalogue, 1873. *Grayia imbricata*, Sp. Bate, is figured, and notice taken that, contrary to one of the characters assigned to the genus *Grayia*, it has an accessory flagellum on the upper antennæ. This species has since been recognised as the young of *Amathilla sabini* (*homari*, Fabr.). The suggestion is made that *Sulcator arenarius*, Sp. Bate, is probably the same as the *Lepidactylis* of Say. This surmise has since been confirmed by S. I. Smith. *Phædra kinahani*, Spence Bate, was included in the list by mistake.

1874. Verrill, A. E., and Smith, S. I.

Report upon the invertebrate animals of Vineyard Sound and adjacent waters, with an account of the physical features of the region. Extracted from the Report of Professor S. F. Baird, Commissioner of Fish and Fisheries, on the condition of the sea-fisheries of the South Coast of New England in 1871 and 1872. Washington, 1874.

The Amphipoda in this report were identified by Mr. S. I. Smith. At page 19 (313) Mr. Verrill says, "these small crustacea . . . . together with the shrimps, constitute *a very large part of the food of most of our more valuable edible fishes, both of the fresh and salt waters.*" The *Orchestia agilis* of Smith, "occurs in countless numbers beneath the masses of decaying sea-weeds." "A much larger species, and one of the largest of all the amphipods, is the *Gammarus ornatus*." "The males are much larger than the females, and sometimes become nearly an inch and a half long." "The only good English name that I have ever heard for these creatures is that of 'scuds,' given by a small boy, in reference to their rapid and peculiar motions." Other species are mentioned, which will be noticed further on. In a "list of species inhabiting the rocky shores of the sounds and bays," p. 37 (331) eleven Amphipods are named.

Of *Talorchestia longicornis* and *Talorchestia megalophthalma*, of the sandy shores, he says, "when driven from their burrows by unusually high tides or storms they are capable of swimming actively in the water," p. 42 (336). Of the sandy shore species he mentions also *Orchestia agilis*, *Lepidactylis dytiscus*, *Unciola irrorata*. To the muddy shores six species of Amphipoda are assigned, p. 83 (377). Among the species commonly found on

submerged woodwork six Amphipoda are mentioned, p. 98 (392), among which it is curious to note that *Chelura terebrans* is *not* included. Of Amphipods ordinarily found on the bottoms of the bays and sounds, he enumerates for those that are rocky, p. 115 (409), nine species; for those that are gravelly and shelly, p. 128 (422), seven species; for those that are sandy, p. 134 (428), two species, *Lepidactylis dytiscus* being included in this and the two preceding lists; lastly, for those that are muddy, p. 140 (434), "several species" of Lysianassinæ, and eight of genera in other families.

In the section on "free-swimming and surface animals," he says, "several species of Amphipods are also common at the surface. The most abundant were *Calliopius læriusculus*, of which Mr. V. N. Edwards also took numerous large specimens in February and March; *Gammarus natator*, which was usually common, and occurred in immense numbers August 10 and on several other occasions; and a *Hyperia*, which infests several species of large jelly-fishes, and also swims free at will. The *Phronima* is a related genus, but is very remarkable for its extreme transparency, which renders it almost invisible in water." The list, p. 158 (452), mentions "several species" of Lysianassinæ, and eleven species of genera in other families.

At p. 163 (457), he says, "among the Crustacea there are a few species of Amphipods that are parasitic. One of these, *Laphystius sturionis*, lives upon the gills of fishes and upon the surface of the body. It was found on the gills of the "goose-fish" (*Lophius*), in Vineyard Sound, and on the back of skates at Eastport." In the list of external parasites, he mentions, besides *Laphystius sturionis*, "Hyperia, species, on jelly-fishes."

On the sandy shores and bottoms of estuaries, three Amphipods are recorded, p. 170 (464); on the muddy shores and bottoms of brackish waters, eight species, p. 177 (471); on oyster beds in brackish waters, four species, p. 182 (476); among eel-grass in brackish waters, eight species, p. 186 (480); on piles, etc., in brackish waters, four species, p. 188 (482); on outer rocky shores, nine species, p. 193 (487); on sandy shores of the open coast, four species, p. 196 (490); on the stony and rocky bottoms on the open coast, nine species, or more, since he says, "species of *Caprella* occur in considerable numbers," p. 200–204 (494–498); on sandy and gravelly bottoms off the open coast, eight species, p. 210 (504); on soft mud and sandy mud off the outer coast, seven species, p. 217 (511).

In the "lists of species found in the stomachs of fishes," pp. 220–227 (514–521), he mentions "Scup; Porgee; (*Stenotomus argyrops.*) Forty young specimens, one year old, taken at Wood's Hole in August, contained large numbers of Amphipod Crustacea, among which were *Unciola irrorata*, *Ampelisca*, sp., etc." "Haddock; (*Melanogrammus æglifinus.*) . . . . A specimen taken at Wood's Hole, November 6, 1872, contained a large quantity of *Gammarus natator*." "Tom-Cod; Frost-Fish; (*Microgadus tom-codus.*) Several specimens from New Haven Harbor, January 30, contained numerous Amphipods, among which were *Mœra leris*; *Gammarus*, sp.; *Ampelisca*, sp.;" others at Wood's Hole, in March, contained "large quantities of Amphipods, especially of *Gammarus annulatus*, *G. natator*, *Calliopius læriusculo*, and *Microdeutopus minax*; and smaller numbers of *Gammarus ornatus* and *G. mucronatus*. Another lot of twelve, taken in April at the same place, contained most of the above, and in addition several other Amphipods, viz., *Mœra leris*, *Pontogeneia inermis*, *Ptilocheirus pinguis*, and *Caprella*." "Ocellated Flounder; Summer Flounder; (*Chænopsetta ocellaris.*) . . contained . . . Amphipod Crustacea belonging to the genus *Ampelisca*." "Spotted Flounder; (*Lophopsetta maculata.*) . . contained . . . numerous Amphipods, *Gammarus mucronatus*." Sea-Herring; (*Clupea elongata.*) . . contained . . . large numbers of an Amphipod, *Gammarus natator*."

The Systematic Catalogue of the Amphipoda inhabiting the coast between Cape Cod and New York, drawn up by Mr. S. I. Smith, occupies pages 261–273 (555–567). It includes

Orchestia agilis, n. s., pl. iv. fig. 14; *Orchestia palustris*, n. s.; *Talorchestia longicornis*, Smith (*Talitrus longicornis*, Say, *Orchestia longicornis*, M.-Edw., and De Kay); *Talorchestia megalophthalma*, Smith (*Orchestia megalophthalma*, Bate, *Talitrus quadrijūdus*, De Kay, "may be based on the female of one of the preceding species, but it is so badly described and figured as to be indeterminable"); *Hyale littoralis*, Smith (*Allorchestes littoralis*, Stimpson); *Lysianassa*, species; *Lepidactylis dytiscus*, Say; *Phoxus kroyeri*, Stimpson; *Urothoë*, species; *Monoculodes*, species; *Laphystius sturionis*, Kroyer (*Darwinia compressa*, Bate); *Calliopius laeviusculus*, Boeck (Kroyer); *Pontogeneia inermis*, Boeck (*Amphithoë inermis* and *crenulata*, Kroyer, *Iphimedia vulgaris*, Stimpson; *Atylus inermis*, *crenulatus*, and *vulgaris*, Bate; *Atylus vulgaris*, Packard, not *Atylus* (*Paramphitoë*) *inermis*, Packard, Mem. Boston. Soc. Nat. Hist., vol. i. p. 298, 1867); *Gammarus ornatus*, M.-Edw., pl. iv. fig. 15 (*Gammarus locusta*, Gould; *Gammarus pulex*, Stimpson); *Gammarus annulatus*, n. s.; *Gammarus natator*, n. s.; *Gammarus marinus*, Leach; *Gammarus mucronatus*, Say (*Gammaracanthus mucronatus*, Bate, on which Smith remarks, "our species cannot be referred to Bate's genus *Gammaracanthus*, for the dorsal margin is not distinctly carinated, and the third, fourth, and fifth segments of the abdomen are furnished with fascicles of spines."); *Mora leris*, n. s.; *Melita nitida*, n. s.; *Ampelisca*, sp., pl. iv. fig. 17, undescribed; *Byblis serrata*, n. s.; *Ptilocheirus pinguis*, Stimpson, which falls to Zaddach's genus *Leptocheirus*; *Microdentopus minax*, n. s.; *Autonoë*, sp.; *Amphithoë maculata*, Stimpson, pl. iv. fig. 16; *Amphithoë valida*, n. s.; *Amphithoë longimana*, n. s.; *Amphithoë compta*, n. s.; *Podocerus fucicola*, Smith (*Cerapus fucicola*, Stimpson); *Podocerus*, sp.; *Cerapus rubricornis*, Stimpson, pl. iv. fig. 18, which Smith later identifies with *Erichthonius difformis*, M.-Edw.; *Cerapus minax*, n. s., presumably *Erichthonius minax*, since in 1880, Smith attributes to the genus *Cerapus*, *tubularis*, Say, as the only species); *? Cerapus tubularis*, Say, subsequently identified without doubt; *Corophium cylindricum*, Smith (*Podocerus cylindricus*, Say, *not* of Bate); *Siphonoecetes cuspidatus*, n. s.; *Unciola irrorata*, Say, pl. iv. fig. 19; *Hyperia*, species, "upon the large red jelly-fish (*Cyanea*)"; "another species of *Hyperia* was taken at the surface in company with *Salpa*;" *Phronima*, species, "closely allied to the *P. atlantica* of Guérin. According to Professor Verrill's notes it is, in life, translucent, scarcely tinged with yellowish-white, and nearly invisible in the water; the eyes red. Another form allied to the last was taken with it, and is possibly the male of the same species, but differs from it, and from the characters usually assigned to the genus, in possessing well-developed antennulæ. In life, according to Professor Verrill, it was translucent whitish, the body spotted with dark brown, and the eyes blackish."; *Thyropus*, species; *Caprella geometrica*, Say, pl. v. fig. 20, which Mayer identifies with *Caprella acutifrons*, Latreille; *Caprella*, species.

In the addenda, p. 451 (745), is given, *Themisto*, species undetermined. "It occurred swimming at the surface in vast numbers, and was thrown up by the waves in windrows, extending several miles along the shores of Martha's Vineyard."

1874. Willemoes Suhm, Rudolph von.

On a new Genus of Amphipod Crustaceans. Received February 27,—Read March 6, 1873. Philosophical Transactions of the Royal Society of London. For the year MDCCCLXXIII. Vol. 163. London, MDCCCLXXIV. pp. 629–636. Pls. XLIX., L.

Thaumops pellucida, already mentioned in the Proc. R. S., 1873, but here figured and more fully described, was afterwards recognised as *Cystisoma neptunus* or *neptuni*, Guérin, 1842,

for which see Note under that date, and compare the account of *Oniscus spinosus*, Fabr., 1775. Some mistakes made in this paper were corrected in an appendix. See the following Note. The specimen was included in a haul made by the Challenger on January 28, 1873, when "the trawl was sent down, in lat. 35° 47′, long. 8° 23′, to a depth of 1090 fathoms." Among other points of interest Dr. Willemoes Suhm here mentions that the muscles of the thoracic legs are only very weakly developed, from which he infers "that the movements of the animal are not very rapid when it is obliged to walk over the sea-bottom." "The transparency of the body makes it possible likewise to distinguish clearly the cephalic ganglion and the ventral chain, consisting of five thoracic and three abdominal ganglia (Plate XLIX. fig. I). The cephalic ganglion is situated in the anterior part of the head, more on the dorsal than on the ventral side; it is 3·50 millims. in width, and is horse-shoe-shaped with pointed ends. From the middle of its anterior margin two large nerves run straight to the end of the antennæ, while from the opposite side two commissural cords run backwards, traversing the head and, after having encircled the mouth, uniting with the first thoracic ganglion. The nerves passing from the sides of the cephalic ganglion are all employed as ocular nerves to supply the huge compound eyes. Those of the anterior end are better seen, as they go to the anterior part of the eyes, while those of the posterior end seem to go to the posterior parts.

"The first thoracic ganglion is seated just underneath the ovary in the second segment, and sends out the nerves for the mouth and the genital organs. The two cords then separate till they are united again in the third segment in the second ganglion; thence they run backwards in a single chain and form a ganglion in each of the subsequent segments, sending nerves to the legs. Altogether we find five thoracic ganglia for six segments, and in the abdomen three ganglia for five segments. The last ganglion of the abdomen is more slender than the preceding ones, and seems to send out nerves in different directions, especially to the anus and caudal appendages. In *Phronima* there are ten pairs of ganglia, five of which, as in the present case, are thoracic and five abdominal." Claus, 1879, it will be found, assigns only four ganglia to the abdomen in the Phronimidæ.

The cæcal appendage of the stomach, described by Claus for *Phronima*, "has, in the present species, assumed so large dimensions as to have replaced the stomach, which does not exist morphologically, but is physiologically represented by the cæcum."

"The heart is an elongated tube extending from the second to the fifth segment (Plate XLIX. fig. 3, *c*). Probably there are three openings in it as in *Phronima*, one in each segment; but of these nothing could be made out.

"The respiratory organs consist of three pairs of small transparent sac-like gills at the bases of the second, third, and fourth pairs of feet (Plate XLIX. fig. I, *br*). They are in form and number nearly the same as in *Phronima*."

"Genital Organs.—The single specimen taken is a female. There is a large ovary, distinguished by its rose-colour, occupying the middle portion of the first body-segment (Plate XLIX. fig. 3, *ov*). I suspect that it consists of two ovaries lying close together, and having two excretory ducts leading to the genital papilla." "The genital papilla is an elevation in the centre of the ventral surface of the first thoracic segment between the two limbs [the first pair of ambulatory legs], which, as I have already mentioned, are destined to bear the eggs at their base, as in the females of *Nymphon*. The colour of the papilla is rose, with scattered scarlet points produced by small spines on the surface of the carapace. In the centre of the genital papilla there is a large spine (Plate L. fig. 6, *d*) with a groove leading into a depression (*e*), in which I believe are seated the apertures of the ovarian ducts. This pit is protected by two soft appendages (Plate L. fig. 6, *l*), answering to the valves which are to be found in most female Amphipods, and in which they keep their eggs. In the present species, however, they are only rudimentary, and they do not seem to be

used for that purpose, as I found the eggs attached to the bases of the first pair of ambulatory legs."

The definition of the genus is given as in the "Proceedings," 1873. Willemoes Suhm thinks it nearly related to *Phronima*, but as "the genital papilla in *Thaumops* is in the centre of the first thoracic segment, while in *Phronima* it is in the seventh body-segment," and for other reasons, he thinks it cannot form a member of the family Phronimidæ. In mentioning the seventh body-segment of *Phronima*, instead of the fifth, he was probably thinking not of the female but of the male.

Bovallius, 1886, says, "for my part, I am convinced that the specimen first described as Thaumops pellucida, must be ranged as a distinct species, which still may keep its [specific] name. The males described 1875 (l. c.) [Trans. Linn. Soc.] are perhaps identical with Guérin's species and may be placed there, awaiting a closer examination." This point, and others connected with the specific distinctions necessary to be established in this genus, will be more conveniently discussed later on in this Report.

1874. Willemoes Suhm, Rudolph von.

Appendix. *On the Male and the Structure of* Thaumops pellucida. Received October 24,—Read December 11, 1873. Philosophical Transactions of the Royal Society of London. For the year MDCCCLXXIII. Vol. 163. London, MDCCCLXXIV. pp. 637ff.

Since the preceding paper was read three males had been caught, the largest "103 millims. in length, exceeding in length the large female by 19 millims." "These males differ from the females by the absence of the genital openings at the base of the first segment and of the breeding lamellæ. The two elongate testes begin just behind the cæcum of the stomach, and their vasa deferentia run down to the last segment of the pereion, where they terminate by two simple openings between the last pair of pereiopods." "There is not a trace of a second pair of antennæ, either in the male or in the female. In the former, however, the first pair of antennæ, the five pairs of ambulatory pereiopods, and the caudal appendages are distinguished by the want of the glandular apparatus. In the females these glands cause an enlargement at the top of each of the appendages in question, and this enlargement is of course also wanting in the male." "The mandibles, which at first I thought were entirely wanting, have now been found. They are very much like those of *Phronima*, only shorter and not so elongate as in that animal; the palpus, which is present in the mandibles of the male *Typhidæ*, could not be detected in *Thaumops*. The first maxillæ are also very small, and differ by their shortness from those of *Phronima*, but otherwise show the same characters. The second maxillæ could not be found with certainty; they are either wanting or represented by an organ which I thought was the labium (Plate L. fig. 6, *lab*). This organ arises from the second joint of a very peculiar appendage, which I have interpreted in my first paper as maxillæ (Plate L. fig. 6, *ma*). I am now satisfied, however, that these are the maxillipeds, consisting of three joints. Two of these joints are united together, the first being attached to the oral apparatus, and the second giving rise to a peculiar organ which consists of two chitinous claws united by a thin layer of the same substance, so as to form a sort of plate. I have already mentioned that I am not quite sure whether this is a labium or, as it seems more probable, the result of the displacement and union of the second maxillæ. This organ is situated at the inner side of the maxillipedes, the third joint of which consists of two strongly denticulated and separate claws. The two appendages (Plate XLIX. fig. 1, *mx*) which I first thought act as maxillæ are the gnathopoda of Spence

Bate, followed by five pairs of pereiopods. The pleopods or swimmerets consist in the male, as well as in the female, of only three pairs."

He still thinks it represents a new family of Hyperidæ, to be placed next to the Phronimæ. It approaches the Typhidæ, he says, by "the elongate shape of the head, with the mouth underneath and the claws terminating the gnathopods. On the other hand, however, the want of the second antennæ in the male, the elongate slender shape of its first antennæ, which show nothing of the enlargement and the olfactory hairs peculiar to the male *Typhidæ*, and the want of the palpus in the male mandible, show that it differs widely from the *Typhidæ*."

He now defines it thus:—

"Caput oblongum, oculis maximis superiorem capitis partem tegentibus. Segmenta thoracica septem, abdominalia quinque. Antennarum in utroque sexu par unum. Mandibulæ et maxillæ minimæ. Maxillipedum par unum conjunctum. Pedum thoracicorum paria septem, anteriora duo parva et chelis armata. Pedum abdominalium paria tria." There is no doubt, he says, that *Thaumops pellucida* is a pelagic Crustacean, retreating sometimes to considerable depths, and coming up only in the night.

1874. Willemoes Suhm, R. von.

The largest Amphipod. Nature. January 8, 1874. Volume IX. London and New York, 1874. p. 182.

This is a letter remarking that *Thaumops pellucida* "has been already described by Guérin-Méneville under the name of *Cystosoma neptuni*," and that the female caught in the Atlantic "had a length of 84 mm., not of 14 mm.," as had been erroneously reported.

1874. Wrześniowski, Augustus.

On Callisoma Branickii, *a new Species from Nice*. The Annals and Magazine of Natural History. No. 79. Vol. XIV. Fourth Series. London, 1874. pp. 15–16.

The new species is compared with "*Callisoma Hopei* and *C. crenata*," which it is said to resemble in the first and second gnathopoda, and in the coxæ of the five anterior pairs of appendages, "but those of the fourth pair of pereiopoda considerably deeper than the ones appertaining to the fifth pair." "The basis in the fourth pair" of pereiopoda "considerably broader and higher than in the fifth pair." There are notches on the dorsal surface of the fourth and fifth pleon-segments. "Telson deeply cut, but single."

1875. Catta, J. D.

Amphipodes du Golfe de Marseille. Comptes rendus hebdomadaires des séances de l'Académie des Sciences. Tome Quatre-vingtième. Paris, 1875. p. 831.

In this extract, Catta says, "en résumé, des Amphipodes normaux sont déjà représentés, dans le Golfe de Marseille, par une trentaine de genres, dont un au moins nouveau, et par soixante-dix à soixante-quinze espèces différentes. Six espèces nouvelles et deux variétés, de formes surtout adriatiques, donnent pour ainsi dire la physionomie de la faune locale."

1875. Catta, J. D.

Note pour servir à l'histoire des Amphipodes du Golfe de Marseille. Revue des Sciences Naturelles. Tome IV.—No 1. 15 Juin 1875. Montpellier. pp. 161–169.

The first species mentioned is "*Ieridium Rissoanum*," for which the synonymy is thus established: *Ieridium fuscum*, Grube, 1863, *Phlias rissoanus*, Sp. Bate, 1862. *Pereionotus testudo*, Sp. Bate and Westwood, "ne saurait se distinguer d'*I. Rissoanum* que par la petitesse de ses yeux et par les dents qui garnissent le bord interne de son antenne supérieure. Ce sont là *tout au plus* des différences spécifiques; les deux Amphipodes appartiennent donc au même genre, et, comme la publication de Grube est de quelques mois antérieure à celle des auteurs anglais, *Pereionotus testudo* doit devenir aussi *Ieridium testudo*." Professor Catta had previously said, "si on ne met pas en doute la description de Guérin de Menneville, le genre *Phlias* doit rester pour ne renfermer uniquement que le *P. serratus*, dont le Pléon serait tout-a-fait normal." The question of the telson seems here to be left still in obscurity, unless we may presume that it is present, from the identification of the names given above, since, although Grube's *Ieridium* is described as having "telson nullum," both *Phlias* and *Pereionotus* are described with a telson. In my opinion *Phlias* should be accepted as the generic name in preference to *Ieridium* and *Pereionotus*. But of the two latter, *Pereionotus*, having been instituted in 1862, has the precedence.

"*Peltocoxa Marioni*" (n. g.) is thus described:—

"Ce nouveau Crustacé a été trouvé dans les fonds coralligères de la calanque de Podesta. Sa longueur, du bout des antennes à l'extrémité du pléon, n'atteint pas 1 millim. Deux de ses coxas sont énormément développés et forment par leur réunion un véritable bouclier rond, large et bombé. Comme cette disposition se répète des deux côtés du corps, l'animal peut se rouler complétement entre ses deux armures et ne plus offrir dans cette position que l'aspect d'une lentille microscopique. L'antenne supérieure, courte et trapue, est terminée par un singulier flagellum dont les articles décroissent très-brusquement et très-inégalement de diamètre. Je ne connais rien, chez les Amphipodes, d'analogue à cette antenne; aussi est-ce avec quelques réserves que je rapproche ce nouveau genre de la famille des Stégocephalidés. Je dédie cette espèce typique à M. Marion." In 1880 Mr. Haswell instituted the genus *Cyproidia*, with the species *ornata* and *lineata*, to which in 1885 I added an English species, *damnoniensis*. In 1882 Sars instituted the genus *Stegoplax*, family Amphilochidæ. It is possible, or even probable, that *Cyproidia* and *Stegoplax* are synonyms of *Peltocoxa*, but with so brief a description as the above, it is difficult to decide either as to genus or species.

Phoxus erythrophthalmus, n. s., is said to come near "*P. Holbölli* de Kröyer," from which it differs, "surtout par la présence d'un œil très parfait de chaque côté de la tête." This eye, he says, does not disappear even when the creature has been long kept in spirit.

"*Anonyx Brocchii*," n. s., is said to be near "*A. Edwardsii* (Kröyer), dont il se distingue par la forme plus ramassée de l'antenne supérieure, par quelques particularités caractéristiques du cinquième siagonopode et par le telson, dont chaque moitié se termine par un poinçon très aigu."

"*Nicea Pontica* (Rathke *sp.*)," is mentioned as belonging to *Nicea*, rather than to *Hyale*, because of Rathke's error in describing the last uropod as bifurcate. But this seems an insufficient reason for cancelling a generic name. It is noted that Czerniavski, though knowing Rathke's species, nevertheless institutes a variety of "*Nicea Pereiri*," under the name of "*Pontica*."

"*Nicea Prevostii* (H. Milne-Edw.)," is given, with "*Amphithoë Prevostii*," M.-Edw., and "*Nicea Macrongx*," Heller, for its synonyms.

Of *Liljeborgia pallida*," Sp. Bate, he confirms Sp. Bate's suspicion, that the telson is not only cleft, but *double*.

Of *Microdentopus anomalus* (Rathke), he thinks it probable that it is the female of *Microdentopus gryllotalpa*. He mentions *Eurystheus erythrophthalmus: Iphimedia obesa*, Rathke; *Ampelisca belliana*, Sp. Bate; *Leucothoe denticulata*, Costa; *Leucothoe articulosa*, Montagu; *Moera truncatipes*, Spinola, with which he thinks Heller's *Mœra scissimana* identical; *Moera integrimana*, Heller; *Lysianassa audouiniana*, Sp. Bate; *Lysianassa spinicornis*, Costa; and alludes to unnamed species in various other genera of Amphipods, which may be found in the gulf.

1875. Grimm, Oscar.

Briefliche Mittheilungen an C. Th. v. Siebold über eine zoologische Untersuchungs-Expedition nach dem Kaspischen Meere. Zeitschrift fur wiss. Zool. 25 Band. Leipzig. 1875. pp. 323–326.

He collected 350 specimens of Gammarids, belonging to four or five species, some of them colossal forms.

1875. Heller, Camil.

Die Crustaceen, Pycnogoniden und Tunicaten der K. K. Österr-Ungar. Nordpol-Expedition. Mit fünf Tafeln. Vorgelegt in der Sitzung am 19 Juli 1875. The plates are inscribed "Denkschriften d. k. Akad. d. W. math. naturw. Cl. II. Abth. XXXVI. Bd. 1875." The back of the title page says "Besonders abgedruckt aus dem XXXV. Bande der Denkschriften," etc.

A full description and figures are given of the new species *Cleippides quadricuspis* and *Amathillopsis spinigera*. Some of the differences pointed out between *Cleippides quadricuspis* and *Acanthonotus* (*Cleippides*) *tricuspis*, Kröyer, may be due to age or accident; it is highly improbable, for example, that the mandible in the one should possess an accessory cutting-plate and a spine-row, and the other be without them. These would rather be generic differences, of which there does not seem to be any question.

The new genus *Amathillopsis* has its definition included in the Latin description of the species:—

"Corpus compressum, dorso carinato, carina segmentorum in spinas retroversas exeunti; epimeris parvis, rigidis, extrorsum flexis. Antennæ superiores inferioribus longiores, pedunculo elongato, flagello appendiculari brevi. Mandibulæ robustæ, in apice dentatæ, processu accessorio etiam dentato, palpo triarticulato, articulo tertio breviore quam secundo. Maxillæ primi paris lamina interiore lata, longa, in margine anteriore setis sex plumosis instructa. Pedes maxillares lamina exteriore brevi, vix ad dimidium articulum palpi secundum elongatum porrecta. Pedes 1^{mi} et 2^{di} paris ferme eadem forma, subcheliformes, non pervalidi; articulo quarto et quinto longitudine fere æqualibus, carpo in angulo inferiore posteriore in processum parvum producto, manu ovali in margine interiore setis et spinis tenuibus instructa. Pedes trium parium ultimorum articulo primo sat angusto, pedes septimi paris iisdem parium duorum præcedentium breviores. Caput rostro frontali

brevi instructum, oculi rotundati. Dorsum carinatum, omnia segmenta thoracis et quatuor segmenta postabdominis anteriora carina in margine posteriore in dentes acutos desinenti. Angulus inferior posticus lateralis segmenti postabdominis 1^mi^, 2^di^ et 3^ii^ in dentem acutum productus. Pedes saltatorii ultimi paris prælongati, ramis laminiformibus, in margine spinulosis. Appendix caudalis obovata, usque ad dimidiam partem styli pedum saltatoriorum ultimi paris porrecta, in margine posteriore sinuata." It is further remarked that this new genus stands between *Amathilla* and *Gammaracanthus*, that it has in common with *Amathilla* the compressed carinate body, the small similarly shaped subcheliform first and second gnathopods, and the simple emarginate telson, while it is distinguished from it by the elongated upper antennæ, the presence of an accessory flagellum, the slender form of the first (femoral) joints of the three last peræopods, the elongate third uropods and the shortened third joint of the mandibular palp. With *Gammaracanthus* it agrees in the form of the antennæ, in the shape of the first joints of the three last peræopods, as well as in the elongated last uropods. It is easily distinguished from it by the short rostrum, the feeble gnathopods, the form of the telson, the structure of the mandibles and mandibular palp, the strongly outward curved lateral edges of the peræon-segments, and the small inferiorly toothed side-plates.

It is rather doubtful whether this genus belongs to the Gammarinæ, among which Heller in the above remarks seems inclined to place it. It seems to approach the subfamily Epimerinæ, Boeck, notwithstanding the minute secondary appendage to the upper antennæ, in the presence of which it in fact resembles *Amathilla* as well as *Gammaracanthus*. An additional species, *Amathillopsis affinis*, from Franz-Josef Land, has been contributed to the genus by Mr. E. J. Miers.

Figures and descriptions are given of "*Anonyx lagena* Kroyer," "*Aristias tumidus* Kroyer," *Onisimus littoralis* Kroyer," with some notes on "*Acanthostepheia Malmgreni* Goës," and some other known species. To Kroyer's *Anonyx lagena*, "*Cancer ampulla* Phipps" is given as a synonym, obviously only by a slip for *Cancer ungae*.

1875. Lenz, Heinrich.

Die wirbellosen Thiere der Travemünder Bucht. Berlin, 1875. pp. 14–17. Also in Schrift. d. Naturwiss. Ver. Schleswig-Holstein. I. Bd. pp. 291, 292, 1875.

Seven species of Amphipoda occur in the inlet of Travemünde, Baltic. (Dr. von Martens, Zool. Record for 1875.)

1875. Lockington, W. N.

Observations on the genus Caprella, and description of a new species. Proceedings of the California Academy of Sciences. Vol. V. 1873–4. (San Francisco, June 1875) pp. 404–406.

Of this paper P. Mayer, Caprelliden, p. 70, gives the following account, "*Caprella spinosa*. Lockington, from Hakodadi Bay, is distinguished by the considerable length of the male (body exceeding 1 inch, anterior antennæ 1 inch long). From the description, however, nothing further can be derived, than that the author does not know the genera with more than five pairs of legs, and also that he takes no account of the mandibular-palp, etc. The species must therefore be considered indeterminate."

1875? Maitland, R. T.

Naamlijst van Nederlandsche schaaldieren. Tijdschrift der Nederlandsche Dierkundige Vereenigung. Eerste Deel. 'S Gravenhage, Rotterdam, 1875? pp. 228–269.

The Amphipoda, pages 241–246, include the names and localities for species of Gammarina numbered 45–60, one of the Hyperina, 61, and Caprellina numbered 62–68. For *Gammarus fluviatilis*, Roesel, Maitland gives the locality as "Onder steenen in een helder stroomende beek buiten de tolsteeg-barrière nabij Utrecht en in't Gein bij Abkoude." Of *Gammarus pulex*, Fabr., he says, "In groote menigte in bijna alle sloten en staande wateren onder steenen en balken, tusschen waterplanten enz. zeer gemeen." *Lysianassa*. Edw., he naturalizes into *Lijsianassa*. "*Amphitoë* Jurini, Edw." he gives doubtfully. He retains the name *Leptomera* in place of the earlier *Proto*. "*Caprella* acutifrons, Edw. III, pag. 108, No. 5. Bate & Westw. II, p. 60," he also gives doubtfully, and likewise "*Caprella* obesa, v. Bened." Of "*Nanprèlia* tristis, v. Bened.," he is doubtful. He closes the list with "*Cyamus*, Lam. 68. ceti. Lin. Edw. III, pag. 113, No. 1. Bate & Westw. II, p. 85. Walvischluis. Op een vinvisch, Balænoptera rostrata, den 10 Dec. 1862 in 't IJ, nabij Zaandam, gestrand." It would have been interesting to have had some description of this *Cyamus*, since Lütken in 1873 says that "hitherto not a single species has been found on a genuine Fin-whale (*Balænoptera*), although some Fin-whales, for instance *B. Sibbaldii*, have been the object of fishery, and the opportunity has been used for looking after parasites. See S. Hallas, Vidensk. Medd. fra den naturhist. Forening for 1867, p. 162."

Among the Isopoda, after *Anceus* is given on page 248, "*Pterygocera* Latr. 76. arenaria. Latr. Zandpissebed. *Slabber*. bl. 92, Pl. XI, Fig. 3, 4. Aan de kust van Walcheren (Slabber.) N. B. Waarschijnlijk de larve toestand eener Idotea-soort." It is curious that in Slabber's own country he should not have accredited to him the specific name which he gave to this now well-known Amphipod, *Haustorius arenarius*.

1875. Martens, Eduard von.

Crustacea. The Zoological Record for 1873; being Volume tenth of the Record of Zoological Literature. London, M.DCCC.LXXV. pp. 183–196.

Thaumatops is suggested in place of *Thaumops* as the name of the Hyperid (*Cystosoma*) [Cystisoma] described as a new genus by Willemoes Suhm. Hesse's *Ichthyomyzocus*, 1873, is criticised.

1875. Metzger, A.

Jahresbericht der Commission zur wissenschaftlichen Untersuchung der deutschen Meere in Kiel für die Jahre 1872, 1873. II. and III. Jahrgang. Berlin, 1875. (With second Title page); Die Expedition zur physikalisch-chemischen und biologischen Untersuchung der Nordsee im Sommer 1872. Die Resultate der Beobachtungen an den Stationen der deutschen Ostsee- und Nordsee-Küsten in den Jahren 1872, 1873. Berlin 1875.

V. *Zoologische Ergebnisse der Nordseefahrt.*. X. Crustaceen aus den Ordnungen Edriophthalmata und Podophthalmata. Bearbeitet von Prof. Dr. A. Metzger in Münden. Hiezu Abbildungen auf Kupfertafel VI. pp. 277–310.

A list of Amphipoda is given, pages 278 to 284, numbering eighty-three species, with particulars as to place of capture, depth, nature of ground and geographical distribution. Species previously taken by Leuckart or by Metzger himself, even if not observed on the present expedition, are included. On *Amphithoë gibba*, R. Leuckart, the note is given, "Von späteren Forschern nicht wieder aufgefunden, oder doch nicht erkannt. Die l. c. [Frey und Leuckart, Beiträge p. 162] gegebene Beschreibung ist zu unvollständig. Nach der Uebereinstimmung mit A. Rathkei zu urtheilen, gehört die Art wahrscheinlich der Gattung Calliopius an." See Note on Frey and Leuckart, 1847. Of *Gammarus elongatus*, Leuckart, he says, "Später, wie es scheint, noch nicht wieder aufgefunden." He notices Boeck's opinion that it may be *Maera longimana*, Thompson. He here gives *Krögera arenaria*, Bate, with Boeck's *Pontocrates norvegicus* as a synonym.

Fuller notes and descriptions of new species are given on pages 296–300. *Dulichia monacantha*, n. s., Tab. vi. fig. 8, is thus described :—

"Caput antice paulum productum et rotundatum. Epimerum primum in spinam longam productum, epimerum secundum margine posteriore rotundato, margine interiore recto et parum modo producto. Pedes secundi paris manu longiore quam latiore, dentibus duobus instructa, dente postico longiore et acuminato. Pedes quinti et sexti paris articulo tertio longitudinem quarti et quinti junctorum vix superanti. Pedes septimi paris articulo quarto longiore quam quinto, articulo tertio prælongato, longiore quam primo. Pedes saltatorii ultimi paris pedunculo vix dimidiam longitudinem rami interioris æquanti. Longitudo animalis c. 5 mm." It comes, he says, very near to *Dulichia porrecta*. Of another *Dulichia*, spec. dubia, he had only a single defective specimen, a female with eggs. This he describes, as also the female of *Hela montrosa*, Boeck, in which his two specimens showed the first guathopods larger than the second, having the hand curved, not with three, but only two teeth. He describes the tubes of *Siphonœcetes cuspidatus*, Metzger, as apparently very fragile.

Byblis crassicornis, n. s., Tab. vi. fig. 9 is thus described :—

"Femina. Corporis forma angustior, antennæ vero robustiores quam in B. Gaimardi; segmentum postabdominis quartum in anteriore parte paulum transverso impressum, postice obtuso carinatum; segmentum postabdominis tertium in angulo inferiore posteriore rotundatum. Caput inter antennas superiores parum productum. Antennæ superiores inferioribus haud multum breviores, articulo pedunculo secundo prælongato, ter longiore quam primo. Antennæ inferiores articulo quarto parum longiore quam quinto. Pedes primi paris manu paulum breviore quam carpo; pedes secundi paris manu multo breviore quam carpo angusto. Pedes tertii et quarti paris ungue tam longo quam articulo quinto. Pedes quinti paris articulo primo altiore quam lato, ovali, in margine posteriore lobo lato semiorbiculari instructo. Pedes sexti paris articulo primo marginibus fere rectis. Pedes septimi paris articulo primo ad marginem inferiorem articuli tertii deorsum et postice productum, articulo quinto lineari, vix breviore quam quarto, ungue stylıforme paulo breviore quam articulo quinto. Appendix caudalis parum longior quam ad basin lata, postice angustior et rotundata in summo dimidio fissa, lacinia utraque in superficie spinis singulis armata. Longitudo corporis 8mm.—Habitat extra oras Norvegiæ Jæderenses in profunditate 106 orgyarum."

On "*Ampelisca Eschrichti*," Kröyer, he notes some differences from Boeck's account. For his criticism of the description and figures assigned by Buchholz to this species, see Note on Buchholz, 1874. He gives some account of *Tritropis helleri*, Boeck, and observes that,

according to Buchholz, it is probably the young of *Tritropis aculeata*, Lepechin. He comments on *Stenothoë marina*, Bate, *Stenothoë monoculoides*, Montagu, *Metopa pulcheriana*, Bate. He retains the last name, though agreeing with Bate and Westwood (vol. ii. p. 499), in the view that Kroyer's *Leucothoe clypeata* is probably the female of *Metopa pulcheriana*.

Lepidepecreum, Bate and Westwood, distinguished, he says, from *Orchomene*, Boeck, only by the want of an accessory flagellum, should find its place in Boeck's arrangement of the Lysianassina just after *Orchomene*. To supply defects in the original description of the genus, he gives the following :—

"Alle Mundtheile von dem seitlichen Kopflappen und der erste Epimere bedeckt. Mandibeln viel langer als breit, an der löffelförmigen oder flach-helmförmigen Spitze ungezähnt ; Palpus sehr lang und schlank, 2gliedrig, Sförmig geschwungen and weit hinter dem elliptischen, nicht sehr hervortretenden Kauhocker eingelenkt. Innere Lade (lobus interior) des ersten Maxillenpaares kurz und schmal, am Ende mit zwei Borsten ; äussere Lade kräftig, an der Spitze mit ungleichen und unregelmässig zweireihig gestellten Zähnen ; Palpus zweigliedrig mit feinzähnigem Endrand und hinter demselben schwach gerieft. Maxillen des zweiten Paares mit sehmalen und nicht sehr langen Laden, die äussere unbedeutend länger als die innere, beide nach den Enden zu mit Borsten bewaffnet. Die hintere oder äussere Lade der Maxillarfüsse, welche eben über das dritte Glied des Palpus reicht, hat einen crenulirten Innenrand und ist hinter der Crenulirung bogenförmig gerieft ; innere oder vordere Lade viel kürzer und schmaler, nur bis zum Ende des ersten, verhältnissmässig starken, Palpusgliedes reichend, an dem schief abgestutzten Ende mit einigen kleinen zahnartigen Vorsprüngen und am Innenrande mit spärlichen Borsten bewaffnet." This is followed by a description of the species *Lepidepecreum carinatum*, Bate and Westwood.

Callisoma krögeri, Bruzelius, was found in great numbers within dead specimens of *Echinocardium cordatum*.

Section III. is "Ueber die Crustaceenfauna der Nordsee diesseits und jenseits der Doggerbank," pp. 306–309. From the Deutsche Bucht, 97 Crust. Podophthalmata et Edriophthalmata were known, of which 46 species were Amphipoda, from Northumberland a total of 167, of which 89 were Amphipoda, and of this 89, 41 were common to both districts. The five Amphipods not known to occur from the Northumberland side were *Amphithoë gibba* and *Atylus falcatus*, from Heligoland ; *Orchomene pinguis* from the west coast of Norway ; and the southern species *Melita palmata* and *Orchestia deshayesii*. Various speculations are entered into, to account for the facts of distribution so far as ascertained. The districts compared were "von Texel (Holland) bis Blaavandshuk (Jütland)" and the Nordseegebiet "zwischen dem westlichen Abhang der Doggerbank und den Küsten von Yorkshire bis zum Firth of Forth." Among the important relations of temperature it is said that "alle Wasserschichten der Nordsee diesseits der Doggerbank, oder, um die Lage genauer zu fixiren, diesseits einer Linie etwa von Scarborough bis zum südlichen Eingang in den Skagerrack oberhalb Houstholmen und Hirshals, im Monat August von der Oberfläche bis zu 20 bis 30 Faden nahezu eine gleichhohe Temperatur besitzen, während jenseits dieser Linie die tieferen Wasserschichten erheblich kühler bleiben als diejeniger der Oberfläche."

Among the species, six in number, named as likely still to be found in the Deutsche Bucht, "*Noenia caudadentata*" is given, perhaps by mistake, for *Nœnia tuberculosa*, Sp. Bate, as it is accompanied by "*Noenia undata*," and Spence Bate's two other species of *Nœnia* are recorded as actually found.

1875. The Micrographic Dictionary. London, MDCCCLXXV.

An article on *Gammarus* mentions the species *pulex* and *fluviatilis*, adding that "there are twenty-three species of *Gammarus*, many of them marine." It also names *Talitrus*

saltator as belonging to the Gammarina. The bibliography refers to Desmarest, Milne-Edwards, Gervais, Westwood, Bate and Westwood in the Annals and Magazine of Natural History.

1875. MIERS, EDWARD JOHN, born 1851 (E. J. M.)

Descriptions of new species of Crustacea collected at Kerguelen's Island by the Rev. A. E. Eaton. Annals and Magazine of Natural History, for July and August 1875. Ser. 4. Vol. XVI. pp. 73–76, 115–118.

"*Lysianassa Kerguelenì*," n. s., is described. This species was subsequently transferred by Mr. Miers to the genus *Anonyx*. It was again found by the Challenger Expedition.

A new genus *Paramæra* is thus defined:—"Superior antennæ exappendiculate, but little longer than the inferior. Gnathopoda subequal, well-developed; dactylos closing along the inferior margin of the palm. Posterior pair of pleopoda with the rami very unequal, the inner ramus short or rudimentary. Telson cleft nearly to the base."

"This genus will apparently include *Melita Fresnelii*, Audouin, and *Melita tenuicornis*, Dana, which latter species is placed by Mr. Spence Bate provisionally in the genus *Maera*." The type species is *Paramæra australis*.

In the August number of the Annals, p. 117, Mr. Miers changes the name of *Paramæra australis* to *Atylus australis*, and in the Phil. Trans. Royal Soc. for 1879, he says, "it is probable that a separate genus will eventually have to be formed for the reception of the two species just mentioned [*Atylus australis*, Miers, and *Atylus* (*Iphimedia*) *fissicauda*, Dana], and *A. austrinus*, Spence Bate. They differ from the normal species of the genus *Atylus*, as restricted by Boeck, in being destitute of dorsal carination, and in some other particulars. For *A. australis* I originally founded a new genus *Paramæra*, allied to *Melita* in having the inner rami of the posterior pair of pleopoda short or rudimentary, but differing from it in the absence of an accessory appendage to the upper antennæ. A subsequent examination of a series of younger examples showed, however, that my original types had sustained injury, the rami in question having been broken off and lost, and that in reality the inner rami are as well developed as the outer in *A. australis*. Yet though the genus *Paramæra* is unavailable for *A. australis*, it will hold good for the reception of *Melita tenuicornis*, Dana ♀, and *Gammarus Fresnelii*, Audouin, mentioned at the time of its publication as apparently included in it; unless, as is probable, there be some error in the figures and descriptions published of these species." In a letter dated October 19, 1885, Mr. Miers says, "I suppose the genus *Paramæra* will hardly stand." The species *Atylus australis* is, I think, without doubt the same as that described by S. I. Smith, under the title *Atylus* (*?*) *australis*, Miers (?), of which Mr. Smith has very obligingly sent me specimens, which will be further noticed later on in this Report.

Podocerus ornatus, n. s., is briefly described, the length given being $\frac{1}{6}$ inch, which is probably a misprint, as the length mentioned in the subsequent fuller report is 13 mm.

1875. NORMAN, A. M.

Submarine-cable Fauna. By J. Gwyn Jeffreys, LL.D., F.R.S., and the Rev. A. M. Norman, M.A. The Annals and Magazine of Natural History for March 1875.

Among the animals found attached to the Falmouth-and-Lisbon telegraph cable laid in June 1870 and taken up for repairs in the autumn of 1874, Mr. Norman mentions four Amphipoda; *Amphithopsis latipes* (Sars), giving reasons for using this name in preference

to *Calliope ossiani* or *Calliope fingalli*, Bate and Westwood; "*Gammaropsis erythrophthalmus*, Lilljeborg = *Eurystheus erythrophthalmus*, B. & W.;" "*Probolium* (= *Montagua*, Bate): fragment"; and "*Ægina phasma* (Montagu) = *Protella phasma*, Bate."

1875. Packard, A. S.

Life-histories of the Crustacea and Insects. The American Naturalist. Volume IX. Salem, Mass., 1875. pp. 583–622.

At page 599, speaking of the embryo in *Oniscus* and *Asellus*, he says, "The abdomen is curved up and backwards, while in the Amphipods it is bent beneath the body, as in Fig. 254, and this is really, as Fritz Muller observes, the only important difference between the embryos, at an early stage, of the two groups. The embryo Isopod at the time of hatching closely resembles the adult, there being no metamorphosis.

"The development of the Amphipods or beach fleas, is nearly identical with that of the Isopods. The eggs of certain species undergo total segmentation, while those of other species of the same genus (Gammarus) partially segment, as in the spiders, and in a less degree the insects, showing the slight importance to be attached to this matter, and that Haeckel's term *Morula* when used for the total segmentation of Crustacea is of little significance, how [ever] much it may be in the lower animals."

"Summary of changes:—

"1. Segmentation of the yolk partial, or total (Morula).

"2. Nauplius state in the egg.

"3. Larva hatching in the form of the adult with the full number of feet; no metamorphosis."

He refers to the works of E. van Beneden, Dohrn, Rathke, and Bobretzky, all concerned with the embryology of Isopods.

1875. Powell, Ll.

Description of a new Crustacean, *Phronima novæ-zealandiæ*. Transactions and Proceedings of the New Zealand Institute, 1874. Vol. VII. pp. 294, 295. pl. xxi. figs. 1–2, 1875.

This species will be considered later on in this Report. It bears a strong general resemblance to *Phronima sedentaria*, Forskål, the distinction between the two being based on characters which are not very striking at first sight.

1875. Rougemont, Philipp de, born 1850, died 1881.

Quæstio inauguralis: Die Fauna der dunkeln Orte. München, 1875. 13 pp.

The author bases an argument on the relationship between *Gammarus pulex* and *Gammarus puteanus*. He makes the pungent observation that the errors which zoologists have made in the establishment of species during the last fifty years it will take a hundred years to correct.

1875. Rougemont, Ph. de.

Natur-Geschichte von *Gammarus puteanus* Koch. Inaugural-Dissertation. München. 1875. 40 pp.

The general structure of the Gammaridæ is described and the sensory appendages discussed. The cylindrical appendages to the flagellum of the upper antennæ are recognised, in

agreement with Leydig and contrary to the view of Spence Bate, as organs of smell. The fact that they are longer in the blind *Gammarus puteanus* and *Asellus* from the wells than in *Gammarus pulex* and *Asellus aquaticus* is regarded as a natural compensation made to the former for their want of sight. To the plumose hairs at the base of the upper antennæ, which Sars and others accept as auditory organs, like those described by Hensen for the Decapods, Rougemont disallows this function, on the ground that to the well- and cave-shrimps hearing would be of no particular service, and that in Amphipods neither auditory vesicle nor otolith has been discovered. He regards the hairs in question as ministering to the sense of touch, and were there any word to express something intermediate between the senses of touch and hearing, he would be willing to adopt it for the function of these organs. He agrees with some earlier writers in ascribing to the cone of the antennary gland a sense of smell, and supposes, while the cylinders of the flagellum smell more distant objects, the cone takes cognizance of food approaching the mouth, an ingenious but not highly probable suggestion. He mentions that Felix Plateau, who like Spence Bate recognised eyes in *Gammarus puteanus*, briefly described these organs as "dreieckig mit sphärischen Winkeln, klein und pigmentlos." But de Rougemont himself had never been able to find any Krystallkörperchen, and is convinced that these animals cannot see and distinguish objects, though the light, penetrating their transparent skin to the rudiment of the optic nerve, may produce a disagreeable impression, which leads them to prefer a safe obscurity.

To the single species, *Gammarus puteanus*, Koch, are referred all the following forms:—I. Form. *Gammarus minutus*, Gervais. *Crangonyx subterraneus*, Sp. Bate. II. Form. *Niphargus kochianus*, Sp. Bate. III. Form. *Gammarus puteanus*, Caspari. *Gammarus puteanus*. Hosius. *Niphargus fontanus*, Sp. Bate. IV. Form. *Gammarus puteanus*, Koch. V. Form. *Niphargus stygius*, Schiödte. *Gammarus puteanus*, Koch, de Lavalette St. George, and Felix Plateau. VI. Form. A colossal specimen, 33 mm. long, from Neuchatel. These identifications were sharply criticised by Alois Humbert, in 1876.

1875. SCHIODTE, J. C.

Krebsdyrenes Sugemund. Med fem Kobbertavler. Naturhistorisk Tidsskrift 3. R. 10. B. Kjobenhavn. 1875. pp. 211–252.

Schiödte considers that the structure of the mouth in the Amphipoda offers three principal types, best distinguished by the connections which determine the movements of the mandibles. The first type belongs to the *Gammarus- Caprella*-forms. Here the mandibles are short, three-sided, with broad triangular base, the outer angle of which is socketed by a short process in the pleural border of the head. On this process and the outer side of the shaft they have an oscillating movement, but being free from the special arrangements for regulating their movements which are found in the other two types, he calls this group Eleutherognatha, defined by the formula, "*Mandibulæ trigonæ, condylo articulario antico carentes. Labrum planiusculum, transversum, simplex.*" The lower lip he describes as having four comparatively soft cushion-like lobes and two more strongly chitinized and calcified horns directed backwards, stiffer than the cushions, yet yielding towards their free ends, so as to constitute a spring stiff enough to hold the mandibles up for their oscillation, yet elastic enough to yield to pressure, and which he therefore designates as "*processus mandibularii labii inferioris.*"

The second type includes most of the *Lysianassina*, Dana. Here, in addition to the arrangements above mentioned, "from the front end of the shaft, on the upper side, in front of the palp, there issues a club-shaped, articular process, rounded at the end, which fits into a corresponding cup on either side of a saddle-shaped process on the palate, close behind

the upper lip, descending into the mouth-cavity." It is this arrangement in connection with the development of the upper and lower lips, that determines the scissor-like movement of the mandibles in this group, which he therefore calls *Trochalognatha*, thus defined, "*Mandibulæ productæ, condylo articulario instructæ antico, acetabulo epipharyngis accommodato. Labrum crassum, conicum, simplex.*" Of this group he considers that there are, as suggested by Kroyer, only two principal types, *Anonyx* and *Opis*, and as the first group correspond with the *Onisci*, as defined by Schiodte, so this with the *Cirolanæ* under the same limitation.

The third type includes the *Hyperina*, and because the outer lobes of the mandibles are pressed into a transverse furrow of the upper lip he calls this group *Piezognatha*, thus defined, "*Mandibulæ productæ, condylo articulario antico carentes, mala exteriore fossæ transversæ labri accommodata. Labrum planiusculum, transversum, duplex.*"

As abnormal among the Eleutherognatha, the mouth-organs are described of *Stegocephalus*, *Cyamus* and *Laphystius*. The illustrations are taken from "Caprella septentrionalis Kr. ♀"; "Laphystius Sturionis Kr. ♀"; "Cyamus ovalis Rouss. de Vauz. ♀"; "Anonyx Lagena Kr. ♀"; "Stegocephalus Ampulla Kr. ♀"; "Themisto libellula Mandt. ♀" "Anchylomera sp. ♀."

The English reader will be glad to know that there is a translation of this highly important paper, "partly condensed with the sanction of the author," in the Annals and Magazine of Natural History, for September, 1876. The beautiful and elaborate plates of the original do not, however, accompany the translation.

1875. Simon, Eugène.

Journal de Zoologie. IV. pp. 114–116.

He enumerates and shortly describes several species of Crustacea living in caves, among them, "*Niphargus subterraneus* (Leach) = *putcanus* (C. Koch) *aquilex* and *stygius* (Schiödte), Carniolia, also in wells." (Dr. von Martens, Zool. Record for 1875.)

1875. Smith, Sidney I.

Report on the Amphipod Crustaceans. Reports on the Zoological collections of Lieut. W. L. Carpenter made in Colorado during the summer of 1873. (Extracted from the Annual Report of the United States Geological and Geographical Survey of the Territories for 1873.—F. V. Hayden, Geologist in charge.) Washington, 1875. pp. 608–611. Pls. I. II.

"Hyalella, *genus nov*," is here defined as in 1874, except that the penultimate segment in the maxilliped-palpus is here said to be "longer than broad." *Hyalella dentata*, pl. i. figs. 3–6, is again described as "*sp. nov.*" *Hyalella inermis*, n. s., pl. i. figs. 1–2, is described, "closely allied to the last species, but wholly without teeth upon the dorsal margin of any of the abdominal segments." On this, Faxon in 1876 says, "after an examination of a large number of *Hyalella dentata* and *H. inermis* from Utah, I am satisfied that they are but varieties of one species." The policy of coining, or retaining, names for varieties is open to question. Where the variation is not sufficiently important to be regarded as specific, it might well, in my opinion, be left without a special name. In the present instance it seems highly inconvenient to have a species named from a particular character, and a variety named from the absence of that very character. If it is impossible to retain both

names as specific, this would seem to be one of the rare cases in which original names might justifiably be changed on account of their inappropriateness. The difficulty, however, will not arise, if, as already suggested, the names may be considered synonyms of *Hyalella andina*, Philippi, 1860. *Gammarus limnæus*, Smith, pl. ii. figs. 13–14, from "Lake near Long's Peak; elevation, 9000 feet," is described, and *Gammarus robustus*, n. s., pl. ii. figs. 7–12, from Wahsatch Mountains, Utah.

1875. Smith, Sidney I.

The Crustaceans of the Caves of Kentucky and Indiana. From the American Journal of Science and Arts, Vol. IX., June, 1875.

Stygobromus vitreus, Cope, from Mammoth Cave, is said to be really a *Crangonyx*, which should stand as *Crangonyx vitreus* (Cope). *Crangonyx vitreus*, Packard, from Indiana, is very different from Cope's species, but closely allied to *Crangonyx gracilis*, from Michigan, Lake Superior, etc., differing principally in the structure of the eyes. Since Packard's species in any case must yield its specific name, one is led by Professor Smith's account to regard it as a synonym of *Crangonyx gracilis*.

1875. Stebbing, T. R. R.

On the genus *Bathyporeia*. The Annals and Magazine of Natural History for January 1875. Ser. 4. Vol. 15. Pl. III. pp. 74–78.

Bathyporeia pilosa, Lindström, is figured and described, with an argument to show that *Bathyporeia pelagica*, Sp. Bate, is the adult male, and "*Bathyporeia Robertsoni*," Sp. Bate, a younger form of the male, of the same species of which *Bathyporeia pilosa* is the female. G. O. Sars, has expressed the opinion that *Bathyporeia robertsoni* is a distinct species. H. Blanc accepts my view.

1875. Stebbing, T. R. R.

On some new exotic Sessile-eyed Crustaceans. The Annals and Magazine of Natural History for March 1875. Ser. 4. Vol. 15. Pl. XV. A. pp. 1–4.

In this paper a new species is described under the name *Dexamine antarctica*. This in November 1878 I transferred to *Atylus* on the ground of its likeness to *Atylus gibbosus*, Sp. Bate, and of its residing, like that species, in a sponge. *Atylus gibbosus*, however, having no palp to the mandibles, belongs not to the Atylinæ, but to the Dexaminæ, and is made by Boeck the type of a new genus *Tritæta*, which name he derives from the Greek Τριταία, without explaining why he introduces an additional letter into the Latinized form of it. My species will become *Tritæta antarctica*, and will probably include as synonyms, *Polycheria tenuipes*, Haswell, from Port Jackson, and *Polycheria obtusa*, Thomson, from New Zealand.

Another new species, described and figured as "*Seba Saundersii*," is said to come from Algoa Bay, South Africa. In 1883, a new genus and species from New Zealand was described by Mr. Chilton under the name *Teraticum typicum*. This is probably the same as my *Seba saundersii*. A specimen brought home by the Challenger was taken in the Strait of Magellan, so that the range of this little species in the south would seem to be very extensive.

1875. Willemoes Suhm, R. von.

Briefe von R. v. Willemoes-Suhm an C. Th. E. v. Siebold. III. Zeitschrift für wissenschaftliche Zoologie. Fünfundzwanzigster Band. Leipzig. 1875. pp. xxxvi-xxxvii.

In this letter, dated "H.M.S. Challenger, Cap York, in September 1874," under the heading "die Thiere der Oberfläche," he says, "Die Crustaceen traten namentlich auf der Fahrt von den neuen Hebriden nach Cap York massenhaft auf, doch fangen die *Euphausiden*, die bei den Fidschi-Inseln noch gemein waren, an, seltener zu werden.—Namentlich schön war die Ausbeute an Stomatopoden Decapodenlarven und an Hyperiden. Von letzteren waren diesmal nicht nur *Hyperia*, *Phronima*, *Cyllopus*, *Cystosoma*, und *Oxycephalus* sondern auch *Rhabdosoma* vorhanden, die abenteuerliche langgestreckte *Typhida*, die wohl zu den seltensten Bewohnern der Oberfläche gehört, da es uns bisher noch nie gelang eines Exemplars derselben habhaft zu werden."

1875. Willemoes Suhm, R. von.

On some Atlantic Crustacea from the 'Challenger' Expedition. (Read May 7th, 1874). The Transactions of the Linnean Society of London. Second Series.—Zoology. Volume I. Part the First. London, M.DCCC.LXXV. Plates VI.–XIII. pp. 23–59.

The part of the paper referring to the Amphipoda is on pp. 24–26, under the heading "On *Cystisoma Neptunus* (*Thaumops pellucida*). (Pl. XI. figs. 1–8)." Willemoes Suhm here objects to supposing that the antennæ in *Cystisoma* represent the second pair, an opinion which he wrongly attributes to Guérin-Méneville. "Against a union of *Cystisoma* with the Hyperids may be advanced," he says, "besides the form of the head (which is more Typhid-like) and the absence of the second antennæ in both sexes, the absence of a palpus on its mandible (Pl. XI. fig. 6). The palpus is always present, according to Claus, in Hyperids, but is wanting in Phronimids." (But on this last point see Note on Claus, 1879.) "The male," he says, "differs by the absence of glands at the top of nearly all the appendages, especially in the last pair of pereiopoda, which, according to this, have not the same clumsy appearance as in the female. The two testes begin just behind the stomach (fig. 5, *t*), and send vasa deferentia to the last segment of the pereion, where two simple genital openings are to be seen between the last pair of legs (fig. 5, *a g*)." He further says somewhat mysteriously, "probably (as in *Phronima*) the full-grown male is somewhat smaller than the female; it seems that *Cystisoma Neptunus* can attain a very considerable size; for the last and largest male which we got in the trawl has a length of 103 millims." This male is the largest specimen of *Cystisoma* as yet on record, so that the probability that the female grows still larger seems to be but slight. The figure 4, apparently of this specimen, is drawn rather less than life-size, although the "Explanation of Plates" gives it as "Nat. size."

1876. Bate, C. Spence.

Report on the present state of our knowledge of the Crustacea. Part I. On the homologies of the dermal skeleton. [*From the* Report *of the* British Association *for the* Advancement *of* Science *for* 1875.] Plates I. & II. pp. 41–53.

Referring to his earlier report, in 1855, Mr. Spence Bate says that in the present report he is desirous "to show:—that the epimera, as sectional pieces in a theoretical construction of a

somite, cannot exist; that the so-called epimera are portions only of the integumentary structure of the appendages of the animal, and that the apodema are formed out of this structure, more or less thinned out by lateral pressure and internal arrangement; and that the head of the lower types and carapace of the higher are homologically the same, the carapace being a monstrous development intended for the covering and protection of the more complicated branchial appendages of the higher types" (p. 47). On page 41 it is stated that "the third pair of maxillipedes in the Brachyurous Crustacea are identical with the first pair of walking-legs in the Stomapoda, Amphipoda, and most of the Isopoda." But, at least as regards the Amphipoda, second gnathopods must have been intended instead of the first pair of walking legs.

1876. Boeck, Axel.

De skandinaviske og arktiske Amphipoder, beskrevne af Axel Boeck. Andet Hefte. (Med 25 kobberstukne Tavler.). Efter Forfatterens Død udgivet ved Hakon Boeck. Christiania, 1876. pp. 161–713.

A preface in French by Hakon Boeck explains that, when Axel Boeck died in May 1873, he left his Manuscript almost complete, but the figures not in all cases named. This deficiency Hakon Boeck had to supply to the best of his ability. In regard to the synonymy he was obliged to depend in part, he says, upon the data supplied by Bate and Westwood. His editorial task must have been one of no slight difficulty, and he deserves the gratitude of the student for his labours.

At page 190 is given *Opisa*, new genus, thus defined:—

"Mandibulæ palpo profundius quam tuberculo molari affixo. Maxillæ 1mi paris lamina interiore angusta, non longa, in apice setas duas plumosas gerenti. Maxillæ 2di paris laminis angustis, non vero longis. Pedes maxillares lamina exteriore elongata, angusta, in margine interiore denticulis instructa, fere ad finem articuli palpi brevis 3tii porrecta; articulo palpi 4to ungviformi. Pedes 1mi paris manu permagna, inflata, in angulo inferiore antico producta et acuta. Appendix caudalis prælongata, profunde fissa." Kroyer's name for this genus, *Opis*, was preoccupied.

For *Opis leptochela*, Bate and Westwood, 1868, Boeck here proposes a new genus, to be called *Leptochela*, of which he says, "I Munddelenes Bygning afviger den ikke saa meget fra slægten *Anonyx*, men dog især derved, at Kjæbefoddernes ydre Plader ere temmelig smale og væbnede med smaa Tænder istedetfor Knuder paa den indre Rand. Springfødderne ere forlængede, og Halevedhænget er særdeles langt, dybt klovet." By the structure of the first gnathopods it approaches, he says, the Oedicerinæ. Besides that *Leptochela* contravenes the rule against adopting a specific name as generic, it falls as a synonym to the earlier *Anonyx*, Norman, 1867.

The Iphimedinæ are accidentally introduced at page 235, as Subfamilia V. of the Gammaridæ, instead of coming later as Subfamilia VII. of the Leucothoidæ. Among these the first genus is *Acanthonotozoma*, A. Boeck. This name supersedes the earlier *Acanthonotus* of Owen and *Vertumnus* of White, both of which are preoccupied. *Acanthonotozoma* itself might have been presumed to be an accidental misspelling or misprint for *Acanthonotosoma*, but that it occurs several times without variation. It is thus defined:—

"Labium superius prælongatum. Maxillæ 1mi paris palpo 2articulato; articulo 1mo longo; lamina interiore permagna, triangulari, multis setis plumosis instructa. Pedes maxillares palpo robusto; articulo palpi ultimo parvo. Pedes 1mi et 2di paris graciles, manu subcheliformi destituti; articulo 5to 1mi paris prælongato, gracili; ungve in margine postico perserrato. Corpus compressum; epimeris magnis, rigidis."

In the Subfamily Dexaminæ, for his genus *Lampra*, 1870, a preoccupied name, Boeck now gives "*Tritacta*. n. g." It is thus defined :—

"Pedes maxillares laminis exterioribus angustioribus, valde curvatis et modo in summo dimidio spinis paucis sed validis armatis; laminis interioribus latioribus et longioribus qvam apud genus Dexamine, spinis multis curvatis et gracilibus armatis. Epimera minima; epimera qvatuor anteriora 5to non altiora, in margine inferiore armata. Pes qvinqve parium ultimorum articulo 4to et 5to perbrevibus; ungve parvo." The type is *Atylus gibbosus*, Sp. Bate.

In his notice of the genus *Haploops*, Liljeborg, Boeck says, "Hos denne Slægt fandt jeg forst og noiagtig undersogte den eiendommelige Halsring, eller rettere Øsophagusring, som ligger indenfor Læberne og er saalede den inderste og en constant Del af Tyggeapparatet."

1876. Catta, J. D.

Note sur quelques crustacés erratiques. Annales des Sciences naturelles. 6e Série. Zoologie. Tome 3, Janvier 1876. Paris. pp. 1–32. Pl. 1. 2.

From some Algæ attached to a vessel, which had come from India round the Cape of Good Hope into the harbour of Marseilles, were taken a group of Crustacea. Among others there were specimens of *Probolium polyprion*, A. Costa, and *Amphithoë penicillata*, A. Costa. Professor Catta gives a full description and figures of *Probolium polyprion*, showing that *Probolium megacheles*, Heller, cannot properly be distinguished from it. He applies the rather inconvenient nomenclature of 1st, 2d, 3d, 4th, and 5th *siagonopodes* respectively to the first and second maxillæ, the maxillipedes, and the first and second gnathopods. Both in the description and figures, however, it is clear that the *premier siagonopode* represents the second maxilla, and the *deuxième siagonopode* the first maxilla. The "saillie très-volumineuse, arrondie et surmontée d'un long poil cylindrique" given as part of the "premier siagonopode" is probably the base and inner plate of the first maxilla. The palp or "pièce externe" of the "deuxième siagonopode" (first maxilla) should no doubt have been represented as two-, instead of one-jointed. The species should moreover have been assigned to *Stenothoë*, Dana, as the mandibles are without palp.

Under the heading, *Amphithoe penicillata*, Professor Catta investigates the relationship between "*Amphithoe Desmarestii*," Sp.-Bate, and *Amphithoe penicillata*, as described first by Costa and then by Heller. He points out that the figures given by the Italian and Austrian authors do not correspond with their descriptions. Carefully figuring and describing the second gnathopod of his own specimen, he decides that the species "*Desmarestii*" of Bate must be united with *penicillata* of Costa. In my opinion the name must be carried back a step further to "*Amphithoë Vaillantii*," Lucas, 1849, in which the hand of the second gnathopods "est profondément échaneré à son bord inférieur, et qui, à la naissance de cette échancrure, est armé d'une épine forte et très-saillante." Costa describes this hand "col dorso prolungato un poco al di là della insersione dell' unghia; il margine ungnicolare assai obliqno ed a curva rientrante; il margine dorsale ornato di lunghi peli, che all' estremità formano un folto pennello." Sp. Bate gives it in his species, "ovate, the upper margin furnished with four or tive fasciculi of hairs; palm oblique, deeply concave, defined by one or two short spines." When it is remembered that in the species of *Amphithoë*, the second gnathopod varies with age and sex, but little confidence will be felt in the multitudinous species at present established on subtle distinctions, referring to the shape of the gnathopods, the length of the antennæ, the colouring of the animal, or perhaps even the locality in which it was captured.

1876. Claus, C.

Untersuchungen zur Erforschung der genealogischen Grundlage des Crustaceen-Systems. Ein Beitrag zur Descendenz-lehre. Wien, 1876.

1876. Faxon, Walter.

Exploration of Lake Titicaca by Alexander Agassiz *and* S. W. Garman. IV. *Crustacea. By* Walter Faxon. Bulletin of the Museum of Comparative Zoölogy, at Harvard College, Cambridge, 1876. Vol. iii. pp. 361–375.

Of the Crustacean fauna of the lake, Mr. Faxon says, "excepting a species of *Cypris*, all the specimens collected belong to one amphipodous genus, *Allorchestes*, which had hitherto afforded but one or two authentic fresh-water species, ranging from Maine to Oregon and the Straits of Magellan. Seven new species are described in this paper from Lake Titicaca. Several of them are remarkable among the *Orchestidæ* for their abnormally developed epimeral and tergal spines. Some are also noteworthy as comparatively deep-water forms of a family commonly regarded as pre-eminently littoral."

The genus *Allorchestes* is thus defined :—"First maxillæ with small uniarticulate palpi. Palpus of the maxillipeds composed of four segments, the distal segment usually bearing a movable spine at its apex. First antennæ shorter than the second antennæ, longer than the peduncle of the second antennæ. First and second thoracic legs subcheliform. Propodite of second pair larger than propodite of first pair, and much larger in the male than in the female. Telson short and entire." *Hyalella*, Smith, 1874, is given as a synonym. My reasons for preferring *Hyalella* to *Allorchestes* are given in Note on Rathke, 1837. Mr. Faxon describes *Allorchestes armatus*, n. s., figs. 1–18; *Allorchestes echinus*, n. s., figs. 19–21; *Allorchestes longipes*, n. s., figs. 22–25; *Allorchestes lucifugax*, n. s., fig. 26; *Allorchestes latimanus*, n. s., figs. 27–28; *Allorchestes longipalmus*, n. s., figs. 29–31; *Allorchestes cupreus*, n. s., figs. 32–34. He also figures *Allorchestes dentatus*, var. *inermis*, fig. 35, for *Hyalella inermis*, Smith. Of his specimens he says, "they differ from specimens from the United States in having a firmer and less transparent shell, and a little differently shaped propodite to the second pair of thoracic legs in the male; hardly enough to warrant the establishment of a new species when one considers the variability of the species within the limits of the United States."

In a note Mr. Faxon says, "Among the Crustacea collected by the Thayer Expedition in Brazil are two species of *Allorchestes*. One is represented by a unique female specimen taken from a canal at Campos by C. F. Hartt. It differs from *A. dentatus*, var. *inermis*, only in the second pair of antennæ, which are half as long as the body and twice as long as the first pair; flagellum composed of thirteen segments. Length of body, 4^{mm}. In the absence of more specimens, I would consider this a variety (*gracilicornis*) of *Allorchestes dentatus*," fig. 36. "The second species is represented by several specimens. It may be called *Allorchestes longistilus*, sp. nov." Fig. 37. "Differs from *A. dentatus*, var. *inermis*, in its slenderer body, longer antennæ, and especially in the length of the third pair of caudal stylets."

1876? Forbes, S. A., born May 29, 1844 (S. I. Smith).

Bulletin of the Illinois Museum. 1. [1876], p. 6, Illinois.

Records *Crangonyx macronatus*, n. s. See Zool. Record.

1876. Fries, S.

Description du *Niphargus puteanus*, var. *Forelii.*, in Forel's Matériaux pour servir à l'étude de la Faune profonde du lac Léman. Bulletin de la société Vaudoise des sciences naturelles. 2. 3. Vol. XIV. Nr. 76. 1876.

1876. Giard, Alfred Mathieu.

On an Amphipod (Urothoë marina), *a Commensal of* Echinocardium cordatum. The Annals and Magazine of Natural History. Number XCIX. Vol. XVII. Fourth series. London, 1876. pp. 261–263. (Comptes Rendus, Jan. 3. 1876, p. 76.)

"*Urothoë marinus* presents a strongly marked sexual dimorphism. The most striking character of the male sex is the length of the inferior antennæ, which greatly exceeds the superior ones. It is well known that it is a character of the same kind that distinguishes the male *Hyperiæ* (*Lestrigonus*) from their females." Judging from the antennæ, as figured by Spence Bate, he argues that "*Urothoë Bairdi* and *Urothoë elegans* must be regarded as representing male individuals; while *Urothoë brevicornis* and *Urothoë marinus* are, on the contrary, figured from the female sex."

1876. Hoek, P. P. C.

Crustacea, meegedeeld in het 1ste Jaarverslag omtrent het Zoöl. Station der Nederl. Dierk. Vereen. 1876.

In all seven Amphipoda are enumerated, none new.

1876. Humbert, Alois.

Description of Niphargus puteanus, *var.* Forelii. By Alois Humbert. (Translated by W. S. Dallas, F.L.S., from an abstract by the author in the "Bibliothèque Universelle: Archives des Sciences," 15th January, 1877, pp. 58–75. The original paper appeared in the "Bulletin de la Société Vaudoise des Sciences Naturelles," tome xiv. 1876. pp. 278–298, pls. 6 and 7.) The Annals and Magazine of Natural History. Number CXI. Vol. XIX. Fourth Series. London, 1877. pp. 243–254.

Humbert assigns the first discovery of well-Amphipods to the year 1835, in point of time, and for the persons, to Gervais and Koch, but Leach's *Gammarus subterraneus*, which he after-

wards mentions, is earlier. Schiödte followed with his *Niphargus* from the caverns, and then new species of *Niphargus* and even new genera allied to it were discovered in wells, caverns, and in the sea. "Finally, in 1869 M. F. A. Forel indicated for the first time the existence of blind Gammaridæ (*Niphargus*) in the depths of the Lake of Geneva, and in 1873 he found the same animals in the Lake of Neuchâtel."

After mentioning the different species belonging to *Niphargus* and its synonym *Eriopis*, and the *Crangonyx subterraneus* of Sp. Bate, he reviews the work of de Rougemont, with whose conclusions he is unable to agree. He has himself found forms agreeing with none of the six described by de Rougemont. One of these, from the Lake of Geneva, he calls "*Niphargus putcanus*, Koch, var. *Forelii*"; the other from a well at Onex, in the environs of Geneva, he calls *Niphargus putcanus*, var. *onesiensis*. In the species of *Niphargus* he has examined, he has "been unable to perceive the least trace of eyes or even of a deposit of pigment."

He minutely describes, and gives the name of *sensitive capsules* to, the very small organs on the dorsal parts of the segments already noticed by de la Valette. These he finds also along the anterior margin of the head and on the first two joints of the peduncle of the superior antennæ. On the antennæ he enumerates *sensitive setæ*, *olfactory cylinders*, *sensitive capsules*, *olfactory setæ*, and *hyaline bacilli*. The last he describes; he says that they "perfectly resemble those figured by Sars upon the joints of the outer branch of the superior antennæ of *Mysis oculata*. He thinks that Jarschinski may refer to them in his paper (in Russian) On the Leydigian organs of the antennæ of the Crustacea Amphipoda, 1868.

As to the idea of practically making *Gammarus pulex* one and the same species with those assigned to *Crangonyx* and *Niphargus*, he points out that, "in the *Gammari* proper the last pair of saltatory feet are biramose; *Gammarus pulex* even has the two branches nearly equal. The *Niphargi* have these branches very unequal, but both of them still exist. In *Crangonyx*, on the contrary, there is only a single branch." Also the telson "is double in *Gammarus*, of a single piece but deeply cleft in *Niphargus*, and completely entire in *Crangonyx*." He believes that *Niphargus* is an ancient genus descended from a form now extinct.

1876. Maitland, R. T.

Determinatie der dieren beschreven en afgebeeld in de werken van Job Baster en Martinus Slabber. Tijdschrift der Nederlandsche Dierkundige Vereeniging. Tweede Deel. 'S Gravenhage & Rotterdam, 1876. pp. 7–15.

For Baster's work he gives in I^e Deel, "Tab. IV. Fig. II. Caprella linearis, Latr.," in IIe Deel, "Tab. III, Fig. VII. VIII. Orchestes littorea. Leach." For Martinus Slabber, he gives "Tab. X, Fig. 1. 2. Leptomera pedata. Mull.," and "Tab. XI, Fig. 3. 4. Pterygocera arenaria. Latr. (door *v. d. Hoeven* de soort ongedetermineerd gelaten)." See Notes on Baster, 1759, 1762, and Slabber, 1769.

1876. Martens, Eduard von.

Crustacea. The Zoological Record for 1874; being volume eleventh of the Record of Zoological Literature. London, MDCCCLXXVI. pp. 199–220.

1876. Miers, E. J.

Catalogue of the Stalk- and Sessile-eyed Crustacea of New Zealand. London. 1876.

Dana's classification, with some slight alterations and additions, is adopted in the catalogue. The Amphipoda occupy pages 117–130. The genus *Paramæra* is provisionally retained for Dana's *Melita tenuicornis*. No new species are described, but, as was reasonable to expect, and as Mr. G. M. Thomson recognises, the publication of the Catalogue gave an impulse to the study of local zoology in New Zealand which has produced many excellent results.

1876. Miers, E. J.

Description of a new species of *Talitrus* from Rodriguez. Annals and Magazine of Natural History for May 1876. Ser. 4. Vol. XVII. p. 406.

The species in question is named "*Talitrus Gulliveri*," after Mr. Gulliver who found it.

1876. Norman, A. M.

The "Valorous" Expedition. Reports by Dr. Gwyn Jeffreys, F.R.S., and Dr. Carpenter, C.B., F.R.S. [From the Proceedings of the Royal Society, Vol. XXV. No. 173, 1876]. London: 1876. (Crustacea, etc., by the Rev. A. M. Norman, M.A.)

No new Amphipoda are recorded, but Tables are given showing that the "Valorous" brought home from Greenland and Davis Strait 39 species of Amphipoda, of which 12 were previously known as North-American, 32 were known as European, 9 were known as British, while the total number of species brought home by other British Arctic Expeditions had been 18. 6 species were brought by the "Valorous" from the North Atlantic, its total of Amphipod species being 42.

1876. Rougemont, Ph. de.

Études de la Faune des Eaux privées de Lumière. Histoire Naturelle du *Gammarus puteanus*, Koch. Paris, 1876.

See Notes on Rougemont, 1875.

1876. Sars, G. O.

Prodromus descriptionis crustaceorum et pycnogonidarum, quæ in expeditione Norvegica anno 1876, observavit G. O. Sars. Separataftryk af Archiv for Mathematik og Naturvidenskab. Kristiania. 1876. pp. 337–371.

The new Amphipods here described are:—103. *Lilljeborgia æquicornis;* 110. *Pleustes euacanthus*, with the observation "Pl. pulchello Kr. affinis sed diversus dorso toto carinato et spinoso, spinis multo majoribus," subsequently called *Paramphithoë euacantha;* 116. *Halirages quadridentatus*, with the remark "H. tridentato affinis, sed major et diversus spinis dorsalibus 4, oculis multo majoribus, antennis et pedibus magis elongatis, segmento 3^{tio}

postabdominis in margine postico non serrato;" 117. *Amphithopsis pulchella*, "A. latipedi M. Sars affinis sed diversa segmentis postabdominis non carinatis nec spinosis, antennis superioribus longioribus, pedibus angustioribus;" 119. *Mæra tenella*, a name preoccupied by Spence Bate for the still smaller *Gammarus tenellus* of Dana, and since changed to *Mæra tenera*; 134. *Dulichia hirticornis*. 131. *Glauconome planipes*, Norm.? is given, with the following notice, "'Unciola planipes, Norman, Report of deep-sea dredging off the coast of Northumberland and Durham,' pg. 3, Pl. VIII. fig. 9–15.—Specimina observata a forma typica differunt manu pedum 2^di^ paris elongato-quadrangulari carpi longitudinem æquante adqve apicem fere ad lineam rectam truncata, antennis inferioribus maris structura valde singulari, articulo pedunculi penultimo et antepenultimo insolito modo dilatatis et complanatis articulationem mobilissimam inter se formantibus." This, in 1879, is given as a distinct species, *Glauconome petalocera*, and in 1885 is renamed *Unciola petalocera*. 137. "*Caprella horrida*, n. sp. (=Caprella spinosissima Norman, non Stimpson)" has been already mentioned in the Notes on Stimpson, 1854, and Wyville Thomson, 1873. It is clearly not an *Ægina*, since Sars expressly describes it as having "Mandibulæ palpo carentes." In 1885 he names it *Caprella spinosissima*, Norman. For his reasons see Note on his work of that date.

1876. Smith, Sidney I.

Contributions to the Natural History of Kerguelen Island, made in connection with the United States Transit-of-Venus Expedition, 1874–75. By J. H. Kidder, M.D. Washington, 1876. Crustaceans. Described by S. I. Smith. pp. 57–64.

The Amphipoda include *Hyale villosa*, n. s.; *Lysianassa kidderi*, n. s., in which "the antennulæ, mandibles, second maxillæ, maxillipeds, and posterior uropods are more like some of the species of *Orchomene* than they are like the species of *Lysianassa*, as described and figured by Boeck, and the characters assigned to *Lysianassa* by this author would require considerable modification to admit our species." *Lysianassa kerguleni*, Miers, "is quite a different species, and not a *Lysianassa*," having the first gnathopods subchelate. Lastly, Professor Smith describes "*Atylus* (?) *australis*, Miers (?)," with references to *? Paramæra australis*, Miers, and *? Atylus australis*, Miers. Dr. Kidder's specimens have "minute secondary flagella upon the antennulæ." "This species cannot be referred to the genus *Atylus* as restricted by Boeck." It will be discussed among those brought home by the Challenger.

1876. Stebbing, T. R. R.

Description of a new species of Sessile-eyed Crustacean, and other notices. The Annals and Magazine of Natural History for January 1876. Ser. 4. Vol. XVII. Pl. IV., V. pp. 73–80.

The species here figured and described as new, under the name *Microdeuteropus bidentatus*, is probably at most not more than a variety of *Antonoë longipes*, Lilljeborg. Notes are made upon *Acidostoma obesum*, Lillj.; *Krøyera arenaria*, Sp. Bate; *Lilljeborgia normanni*, which is a synonym of *Cheirocratus sundevalli*, Rathke; *Melita gladiosa*, Sp. Bate; *Proto goodsiri*, Sp. Bate. It is remarked that the last species possesses two pairs of styliform appendages of the pleon, not a single pair as Spence Bate had stated. It is further suggested that *Proto goodsiri* is a form of *Proto pedata*, Leach. This suggestion is confirmed by Mayer, who unites them as synonyms of *Proto ventricosa*, O. F. M.

1876. Stebbing, T. R. R.

Amphipodous Crustaceans. On the genera *Hyale* and *Anonyx* and a new species of *Probolium*. The Annals and Magazine of Natural History. May, 1876. Ser. 4. Vol. XVII. London, 1876. pp. 337–346. Pls. 18. 19.

The species named in the Brit. Sess. Crust., "*Allorchestes Nilsonii*," Rathke, and "*Nicea Lubbockiana*," Sp. Bate, are here called respectively "*Hyale Nilsonii*," and "*Hyale Lubbockiana*," Boeck's view being accepted that *Allorchestes* and *Nicea* are both synonyms of the earlier *Hyale* of Rathke. Boeck's opinion that the two species in question are also identical is rejected. I am at present inclined to believe that *Hyale lubbockiana* is a synonym of *Hyale pontica*, Rathke. Under the heading "*Anonyx serratus*, Boeck," the suggestion is made that *Orchomene pinguis*, Boeck, *Orchomene serratus*, Boeck, and *Orchomene minutus*, Kroyer, are but one species, which might be retained in the genus *Anonyx*. It is proposed that "*Anonyx Edwardsi*" and *Anonyx minutus* of the Brit. Sess. Crust., i. pp. 94, 108, should fall to the same name. G. O. Sars decides, in 1882, that *Lysianassa longicornis*, Sp. Bate, and "*Anonyx Edwardsi*," Sp. Bate (non Kroyer), are respectively the male and female of one species, which he names "*Orchomene Batei*:" but the first gnathopods of the species which Spence Bate accepts as *Lysianassa longicornis*, Lucas, will not admit of this identification. The male specimen which I have described in this paper is no doubt "*Orchomene Batei*," Sars.

"*Probolium Spence-Batei*," n. sp., is described and figured, but as nothing is said about the mandibles, and the specimen itself has perished, the true position of this species must remain indefinite. It may possibly belong to *Amphilochus*, rather than either to *Stenothoë* or *Metopa*, to one or other of which species of *Probolium* are generally synonymous.

Some notes on *Urothoë* are given.

1876. Stebbing, T. R. R.

On some new and little-known Amphipodous Crustacea. The Annals and Magazine of Natural History. December 1876. Ser. 4. Vol. XVIII. Pl. XIX., XX. pp. 443–449.

Amphilochus concinna is described as a new species, but as subsequently explained in the Annals for November 1878, it is probably identical with *Amphilochus manudens*, Sp. Bate, though differing to some extent from that author's account of his species. Meinert records it from Storebelt. *Danaia dubia*, Sp. Bate, is figured and described. *Callimerus aculigitata* is described and figured as a new genus and species, but this is subsequently cancelled in the Annals for November 1878, as being a synonym for *Amphilochus manudens*. *Exunguia stilipes*, Norman, 1868, and *Cratippus tenuipes*, Sp. Bate, 1862, are compared, the conclusion drawn being that the genera are the same. No doubt the species are also identical. *Colomastix pusilla*, a new genus and species described by Grube in 1861, bears a strong resemblance, and in regard to the generic name, *Colomastix* supersedes both *Cratippus* and *Exunguia*.

1876. Willemoes Suhm, Rudolf von.

Preliminary Report to Professor Wyville Thomson, F.R.S., Director of the Civilian Scientific Staff, on Observations made during the earlier part of the Voyage

of H.M.S. Challenger; and on Crustacea observed during the cruise of H.M.S. Challenger in the Southern Seas. (Read March 16, 1876.) Proceedings of the Royal Society of London. Vol. XXIV. London, MDCCCLXXVI. pp. 569–592.

On page 570 he refers to the capture of "a large female of *Cystisoma Neptunus*," on the way from Gibraltar to Madeira. In the "List of the land animals collected in the Tristan d'Acunha group," for Crustacea, he gives, p. 585—

"1. *Oniscus*, everywhere under stones; 2. *Gammarus*, everywhere under stones."

After describing, page 587, a gigantic Ostracod brought up by the deep-sea dredging between Prince Edward Island and the Crozets, he says, "this is not the only example, however, of gigantic forms in the deep sea, for the same trawlings brought up two specimens (from 1375 and 1600 fathoms) of a Gammarid Amphipod, the larger of which has a length of 60 millims. and a height of 35 millims. Though we now know that certain Hyperids (*Cystisoma Neptunus*, both sexes of which we found in the Atlantic, and described in the Phil. Trans. 1873; see also Trans. Linn. Soc. 1875, 2nd ed. Zool. i. p. 24) attain the considerable length of more than 4 inches, these transparent and elongated animals do not make such an impression as the Gammarids, which are besides in no way peculiar, being perfectly normal, and approaching perhaps most the genus *Typhimedia*. I shall therefore give later a more accurate description of them, and *here only direct attention to the fact that in the deep sea, as well as in the sedimentary strata, animals are found which, compared with their relations living now-a-days, and in shallow water, are of a very considerable size*; and I may perhaps best in this place add that in this dredging of 1375 fathoms a Nymphoid (Pycnogonid) was got measuring nearly *two feet across the legs*." The Gammarids referred to I have described under the name *Audania gigantea*. The genus *Typhimedia* is probably an error for *Iphimedia*.

On page 589 he says, "In Kerguelen Island, where we stayed nearly a month, much shallow-water dredging took place in the different harbours, most of which was done by Professor Wyville Thomson himself, while I was on shore collecting the land animals of the place. There is no *Gammarus* with terrestrial habits nor any *Oniscus* to be found in these barren islands, animals which still exist on the Tristan d'Acunha Islands." Nevertheless, for Amphipods found on the rocky beaches of Kerguelen, see Note on S. I. Smith, 1874.

On page 590, he says, still referring to Kerguelen, "the Crustacea inhabiting the shallower water are several species of *Serolis*, *Sphæroma*, *Arcturus*, some Gammarids, several species of *Caprella*, one of which has a very slender and long manus, and some Pycnogonida. There is scarcely anything interesting to be found in that zone [going from a few fathoms down to forty]. In the second zone [40–120 fathoms] of deeper water (though not deep-sea fauna, which we scarcely ever have found in less than 500 fathoms) we had a richer harvest; *Tanais* and *Praniza*, very curious Amphipods, Mysids, and *Nebalia* are the inhabitants, about which I shall now say a few words."

The long-handed *Caprella* is no doubt the species since named *Dodecas clongata*.

In this second zone, with a larger species of *Serolis*, "an Amphipod occurred, a Gammarid, distinguished by a bright *red frontal prolongation* of the head and having no eyes. These I first thought might be discovered in some form or other in the red proboscis; but my expectations were not justified by the results of the dissection. The organ is divided by a line along its top into a right and left portion. The chitinous layer has got no facettes, and the whole organ is filled by a finely granulated red pigment. What its function may be I cannot say, having never met with anything like it." This is no doubt the species named *Œdiceropsis rostrata*, in the Annals and Magazine of Natural History for March 1883, but transferred to a new genus, *Œdiceroides*, in this Report.

On page 591 he says, "between Kerguelen and Heard Islands we dredged in 150 fathoms, but

got only a *Scalpellum*, an *Arcturus*, and a spiny Amphipod, which is the corresponding form to the *Gammarus loricatus* of the North. Near Heard Island, in 75 fathoms, we found the same animal and a Sphæroma, but no other Crustacea at all." The spiny Amphipod is named in this Report *Acanthechinus tricarinatus*. I have seen no second specimen of this striking species, but as *Iphimedia pulchridentata* was dredged in 75 fathoms near Heard Island, it is probable that on a cursory inspection this species was mistaken for the other.

1877. Bate, C. Spence.

Report on the present state of our knowledge of the Crustacea. Part I. On the homologies of the dermal skeleton (*continued*). [*From the* Report *of the* British Association *for the* Advancement *of* Science *for* 1876.] London, 1877. Plates II. & III. pp. 75–94.

At page 81 Mr. Spence Bate says, "the fact that the supposed side-plates, or epimera, were merely the first joint of the normal legs or appendages has been satisfactorily demonstrated in the Edriophthalmia, as far as relates to the somites of the pereion; but hitherto the relation of the side-plates of the pleon to the normal condition of the mobile appendages had not been demonstrated until the structure of the dermal anatomy of the genus *Apseudes* had been made out. [Hist. Brit. Sessile-eyed Crust., vol. ii. p. 146 (*Apseudes*)]; that 'one interesting and, as far as we know, unique feature in these Crustacea yet remains to be noticed. The segments of the pleon have the lateral walls (long known as the epimera of Milne-Edwards, called also the pleura by many authors) existing as articulated appendages, demonstrating two important features in the homologies of these parts: 1st, that they are all really portions of the appendages, being the first joint or coxæ of the pleopod . . . and 2nd, that, since the peduncle consists of three joints, the second branch in the appendages of the pleon, as in other parts, is shown to take place invariably at the extremity of the third joint.'" It seems to me, however, that the force of this argument is weakened or destroyed, by the fact that numerous species of *Apseudes* have now been examined and described by various authors, and in regard to no one of the species has any author followed Mr. Spence Bate in speaking of the epimera of the pleon as articulated.

As a curious fact in comparative carcinology, Mr. Spence Bate observes, that "contrary to a possible condition of all other appendages, the coxal joint of the first pair of antennæ is never absorbed into or fused with the sternal portion or ventral arc of the somite to which it belongs" (p. 85). Numerous allusions to the Amphipoda occur, as might be expected, in different parts of this memoir.

1877. Chatin, Joannes.

Recherches pour servir à l'histoire du batonnet optique chez les crustacés et les vers. Annales des Sciences Naturelles. Sixième série. Zoologie, Tome V. Paris, 1877.

A list is given of earlier works bearing on the subject. In regard to the *cône*, "cette pièce generalement brillante et réfringente qui surmonte le bâtonnet optique dans les Arthropodes," he says, "La forme du cône est, de tous ses caractères, celui qui présente les variations les plus nombreuses et les plus considérables. Il est en général prismatique chez les *Typton*, *Epimeria*, *Lichomolgus;* ovoide dans les *Eupagurus*, *Paguristes*, *Caprella*, *Notopterophorus;*

pyramidal chez les *Cypridina* et *Lysianassa;* claviforme chez les *Isæa;* cylindro-conique dans certains *Squilla*, etc."

1877. Hoek, P. P. C.

Carcinologische Aanteekeningen. Bijdrage tot de Kennis der Noordzee-Fauna (2de Jaarslag, 1877).

No new Amphipoda are reported.

1877. Huxley, Thomas Henry.

A Manual of the Anatomy of Invertebrated Animals. London, 1877.

The Edriophthalmia are described on pages 359 to 367. "These resemble the *Podophthalmia* in never possessing a greater than the typical number (20) of somites, though, in some members of the group, the body is composed of fewer somites, in consequence of the abortive or rudimentary condition of the abdomen." The genus *Amphithoë* is chosen for special description, but it is not easy to see why this name should have been chosen for the animal figured, which has a large rostrum, the back carinate and almost every segment dentate, the fifth side-plate shorter than the fourth, and the upper antenna showing a secondary flagellum, suggesting, therefore, *Gammaracanthus loricatus* rather than any *Amphithoë*. The head proper, in Professor Huxley's view, has only five pairs of appendages, the sessile eyes not being counted. These are the antennules, antennæ, mandibles, and two pairs of maxillæ. The first pair of thoracic appendages "are applied against the mouth, and form a large lower lip." "The 'head' of *Amphithoë*, therefore, is formed by the coalescence of the seven anterior somites of the body; but I believe that the tergum of the seventh (or first thoracic) somite is obsolete, as in a Stomatopod, and hence that the tergal surface of the head of the Edriophthalmia corresponds exactly with the cephalostegite (or that part of the carapace which lies in front of the cervical groove) in *Podophthalmia*. Mr. Spence Bate has shown in his valuable 'Report on the *Edriophthalmia*,' that, in the *Crustacea* at present under discussion, a strong apodeme arises on each side from the posterior part of the sternal region of the head, and passing inwards and forwards meets with its fellow, to form an endophragmal arch, which supports the œsophagus and stomach and protects the nervous commissure between the first and second sub-œsophageal ganglia, which runs under it. The discoverer of this structure conceives that it represents the terga of the three somites immediately succeeding the mouth; but I cannot see that it is other than the representative of the precisely similar mesophragm formed by the anterior apodemes in *Astacus*. In fact, the correspondence in structure between the head of an *Amphithoë* and the cephalic portion of the cephalo-thorax of *Astacus* is not a little striking. There is the same sternal flexure, the same relative position of the stomach, and of the insertions of the mandibular muscles. The great difference lies in the abortive condition of the ophthalmic appendages." In treating of the embryology the remark is made that "in certain Amphipods (*Gammarus locusta* and *Desmophilus*) the vitellus undergoes complete division; while, in closely allied forms (*Gammarus fluviatilis* and *pulex*), and still more completely in those *Isopoda* which have been studied, the part of the vitellus which divides into blastomeres, becomes more or less completely separated from the rest immediately after fecundation, and the so-called partial yelk division, take place." A note gives a reference to "E. van Beneden, Recherches sur la Composition et la Signification de l'Œuf, 1870." By consulting this work Mr. W. E. Hoyle has found for me the clue to the mysterious

word *Desmophilus*. In the first place it is a misprint for *Dermophilus*, which should have been noticed under the date 1870. In that year Beneden and Bessels, in their Mém. sur la Formation du Blastoderme chez les Amphipodes, etc., p. 26, footnote, say, "Nous avons eu l'occasion de constater le portionnement total du vitellus et un mode de formation du blastoderme tout à fait identique à celui que nous avons reconnu chez le *Gammarus locusta*, dans un groupe d'Amphipodes tout nouveau, dont nous proposons de donner prochainement la description.

"Ces crustacés remarquables vivent en parasites sur le *Lophius piscatorius*, et les modifications qu'ont subies les caractères du groupe auquel ils appartiennent, par l'influence de leur vie parasitique, sont d'un haut intérêt à divers points de vue. Nous proposons pour cet animal le nom de *Dermophilus lophii*.

"On connaîtra bientôt des parasites dans tous les groupes de crustacés. On connait des cyrrhipèdes parasites en grand nombre; certaines espèces de baleines en sont littéralement couvertes; les Lernéens sont véritablement des Copépodes parasites; on connait depuis longtemps des Isopodes parasites; enfin nous venons de découvrir un parasite qui, anatomiquement comme embryogéniquement, est un véritable Amphipode."

E. van Beneden, in the paper to which Professor Huxley refers, says at p. 132, "l'epithéléon envoie souvent à l'intérieur des tubes ovariens des prolongements, en forme de cloisons transversales . . . .; quelquefois comme dans le genre *Dermophilus* (Ed. van Ben. et Em. Bess.), ces prolongements sont de véritables lames cellulaires qui séparent complétement dans le vitellogène deux œufs voisins." At page 136, a footnote gives a reference, in regard to this genus, to Édouard van Beneden et Émile Bessels. Mém. cour et des sav. étr. de l'Acad. roy. de Belg., t. xxiv.," by error for t. xxxiv. It is obvious that van Beneden applies the term *parasitic* to any creature which lodges upon another, whether it feeds upon the carcase of its host or not. It is probable that the *Dermophilus lophii* here mentioned is the same as the *Ichthyomyzocus lophii* of Eugène Hesse, 1873, while Hesse's *Ichthyomyzocus* appears to be partly, if not entirely, identical with Kroyer's *Lafystius*, 1842. See additional Note on Hesse, 1873, in Appendix.

For the comparative anatomy of the Crustacea, the English student will do well to read what Professor Huxley has to say in this volume on all the groups, or to study his work entitled, The Crayfish, an introduction to the Study of Zoology.

1877. MARTENS, EDUARD VON.

Crustacea. The Zoological Record for 1875; being Volume twelfth of the Record of Zoological Literature. London, M.DCCC.LXXVII. pp. 213–234.

The following account is given of M. Hesse's curious new genus:—

"Piscicolæ. A new family proposed for the reception of *Ichthyomyzocus*, g. n.; 3 anterior pairs of feet directed forwards with hooked claws; the 4 posterior longer, with nearly straight claws; abdomen composed of 2 or 5 segments; respiratory organs in the form of a double cylindrical multiannulated hairy rod on the under side of the abdomen; end of the abdomen two-branched, each branch terminated by several leaflets. This family connects the *Amphipoda* with the *Isopoda*. *I. ornatus*, *morrhuæ*, *lophii*, and *squatinæ*, spp. nn., living as parasites on the cod, toad-fish, and angel-fish on the Atlantic coast of France. Hesse, Ann. Sci. Nat. (5) xvii, pp. 1–16, pl. iv. [The description is not quite satisfactory; according to the position of the respiratory organ, this genus should be placed rather with the Isopods than with the Amphipods.]" There seems here to be some misconception in the account of the abdomen. The pleopods also, to which Hesse attributes respiratory functions, are, according to his description, of the character usual among the Amphipoda, not like those of Isopoda. Compare the Note on Hesse, 1873.

1877. Meinert, Frederik Vilhelm August, born March 3, 1833 (J. J. S. Steenstrup).

Crustacea Isopoda, Amphipoda et Decapoda Daniæ: Fortegnelse over Danmarks Isopode, Amphipode og Decapode Krebsdyr. Naturhistorisk Tidsskrift. III. Raekkes, 11. Bind. 1877–1878. pp. 57–248.

A list of Crustacean literature is given, pages 58 to 68. The discussion of the Amphipoda begins at page 91. Meinert prefers to reinstate Montagu's specific name for *Hyperia galba*, on the ground that O. F. Müller's account of *Cancer medusarum* is too indefinite, and not like Montagu's, supported by figures. But Montagu's figure is of so little service for specific distinction as to constitute but a weak reason for displacing the older and well-established name *medusarum*. Meinert includes in the synonymy *Hyperia oblivia*, Kroyer, and *Lestrigonus kinahani*, Sp. Bate, in regard to which compare Note on Thomas Edward, 1868. Meinert also prefers the name *Orchestia littorea*, Montagu, to *Orchestia gammarellus*, Pallas, on the ground that the figures and descriptions in Pallas are "insufficient to distinguish his Oniscus Gammarellus from his O. Locusta." But the Notes on Pallas, 1766, 1772, will, I think, show that this opinion is erroneous.

Pontoporeia furcigera, Bruzelius, is kept distinct from *Pontoporeia femorata*, Kroyer, on the ground that Kroyer could not possibly have overlooked the striking furcate process on the back of the fourth pleon-segment. But it seems that Kroyer did not do so, although in his specimen it may have been weakly developed. It is figured in the "Voy. Scand. Crust., t. xxiii., f. 2, a–y;" to which Meinert himself refers under *Pontoporeia femorata*, Kr.

To *Bathyporeia pilosa*, Lindstrom, are assigned as synonyms "? Bathyporeia Robertsonii Sp. Bate," and "Bathyporeia pelagica Sp. Bate," both as male forms. *Bathyporeia tenuipes*, n. s., is thus defined:—"Antennæ superiores subnudæ, flagello appendiculari biarticulato. Antennæ inferiores articulo tertio et quarto longis atque tenuibus. Angulus capitis acutus, productus. Pedes omnes tenues, modice hirsuti; pedes saltatorii ultimi paris setis simplicibus instructi."

Under "*Phoxus Holbølli* Kroyer," is given "Forma altera maris: Antennæ superiores paulo longiores. Antennæ inferiores tenuissimæ, fere corporis longitudinis. Pedes saltatorii paris ultimi multo longiores, setis longis plumosis obsiti."

Urothoë marina, Sp. Bate (♂), and *Urothoë brevicornis*, Sp. Bate (♀), are accepted, in accord with Bate and Westwood's suggestion, as the two sexes of one species.

Paramphithoë glabra, Boeck, and *Paramphithoë bicuspis*, Kroyer, are the names given to two species which Boeck in his latest work assigned to *Pleusles*.

Of *Calliopius norvegicus*, Rathke, Meinert remarks that it is by no means easy to distinguish it from *Calliopius læriusculus*, in which I quite agree with him. He thinks it may be no more than a variety of *læriusculus*. Of *Gammarus locusta*, Linn., he says that the young differ from the adults in having the eyes small, round or oval, and the rami of the last uropods often of different lengths. He agrees therefore with the general view in making *Gammarus pœcilurus*, Rathke, a synonym of *locusta*; but he also thinks that *Gammarus marinus* is only a shallow water variety.

In the synonymy of *Gammarus pulex*, Pennant, he places *Gammarus pulex*, of Hosius and others, "Gammarus Roeselii Gervais," *Gammarus fluviatilis*, Milne-Edwards, *? Gammarus lacustris*, G. O. Sars, *? Gammarus neglectus*, G. O. Sars. Between *Gammarus pulex* and *Gammarus neglectus* he has met with the intermediate gradations. If Sars' species is maintained, he thinks that the earlier name for it should not have been altered, in which also I agree with him.

Pallasea, Sp. Bate, he spells *Pallasia*, but this improvement must be avoided, as with it the name is preoccupied.

"*Amathilla sabini* Leach," is considered to include as a variety, *Gammarus angulosus*, Rathke, and *Amathia carino-spinosa*, Sp. Bate. Zaddach's *Leptocheirus* is (not rightfully) made a synonym of the later *Ptilocheirus*, Stimpson. To the species *Leptocheirus pilosus*, "? Protomedeia hirsutimanus Sp. Bate," is given as a synonym. *Eisladus longicaudatus*, Sp. Bate and Westwood, is retained as a separate species under the name *Photis longicaudata*. To *Protomedeia fasciata*, Kröyer, are assigned as synonyms *Autonoë macronyx*, Lilljeborg, and "*Microdeutopus Websteri*," Sp. Bate.

Under *Gammaropsis erythrophthalmus*, Lilljeborg, he mentions that a specimen from Nyborg was labelled "Autonoë Karmoensis Boeck." "Without doubt," he says, "hereby a new species is designated, which, however, I have not found described by Boeck. I found no difficulty in determining it as above."

Of "*Podoceropsis Sophiæ*," Boeck, he mentions finding a specimen labelled, "Harpilia typica Bk." In this genus he gives *Podoceropsis excavata*, Sp. Bate, and *Podoceropsis rimapalmata*, Sp. Bate, both transferred from Sp. Bate's genus *Nænia*.

With "*Siphonœcetus Colletti*, Boeck," he found one of Boeck's labels bearing the name "*Corophium Steenstrupii*," and with "*Glauconome Steenstrupii*," Boeck, he found a label, "*Harmophia Kröyeri*, B."

The localities and synonyms of various other species are given in this work, but without descriptions, as indeed is the case with most of those above-mentioned.

1877. MIERS, E. J.

List of the species of Crustacea collected by the Rev. A. E. Eaton at Spitzbergen in the summer of 1873, with their localities and notes. Annals and Magazine of Natural History for February 1877. pp. 131–140. Vol. XIX. Fourth Series. London, 1877.

No new species are here recorded, but for *Lysianassa* (*Anonyx*) *lagena*, Kroyer, is substituted the name *Anonyx nugax*, Phipps, with the remark, "Phipps's figure of this common Arctic species is quite recognizable; and his name must therefore be adopted for it." *Lysianassa bidenticulata*, Sp. Bate, 1858, which its author had in 1862 transferred to *Cancer* (*Lysianassa*) *nugax*, Phipps, and which Boeck identified with *Gammarus nugax*, Owen, under the name *Socarnes vahli*, Kroyer, is here re-established as *Anonyx bidenticulatus*, Spence Bate, being "distinguished by the form of the third segment of the pleon, which has a second tooth on its posterior margin above that of the postero-lateral angle," instead of being "valde rotundatus" as in *Socarnes vahli*. Sars, in 1885, calls it *Socarnes bidenticulatus*, Sp. Bate. *Acanthozone* (*Acanthosoma*) *hystrix*, Owen, is re-established, with the observation, "This species has been referred by Boeck to the *Oniscus cuspidatus* of Lepechin (Acta Acad. Sci. Petrop. p. 249, pl. viii. fig. 3, 1780); but the species figured by that author differs in having vertically projecting spines upon only the first four segments of the pereion. The species figured by Buchholz (Zweite deutsche Nordpolarf. Zool. Crust. p. 362, pl. xi.) as *Acanthozone hystrix* differs from that figured by Owen in the more numerous and closely placed spines upon the posterior margins of the basa of the pereiopoda, and in the form of the rostrum, and is, I think, distinct."

1877. Miers, E. J.

Report on the Crustacea collected by the Naturalists of the Arctic Expedition in 1875–76. The Annals and Magazine of Natural History. Number CXV. pp. 52–66. Number CXVI. pp. 96–110. Vol. XX. Fourth Series. London, 1877.

The account of the Crustacea "is confined to the species collected between lat. 78° and 84° N." "The most northerly species collected is *Anonyx nugax*, one of the commonest and most abundantly distributed of the Arctic Amphipoda, and first made known to science a hundred years ago by Phipps." At page 56 a table is given of "the Geographical distribution of the Crustacea collected by the Arctic Expedition north of lat. 78° N." This includes 12 species of Amphipoda, common to Greenland and Spitzbergen, 9 of them being also Scandinavian, 5 or 6 of them belonging to Arctic America, 3 to Iceland, 4 to Britain, 2 to north-east Asia. A species of Amphipod, "perhaps belonging to the genus *Pherusa*," is mentioned as having been collected by A. C. Horner, Esq., while on board the yacht "Pandora."

On *Anonyx nugax*, Phipps (*Anonyx lagena* of Sp. Bate, Boeck and Buchholz), Miers says, "my observations scarcely agree with those of Mr. Buchholz and other authors as regards the rare occurrence of the males of this very common and well-known Amphipod." The far longer flagella of the inferior antennæ distinguish the males. The largest male taken measured 1½ inch, the largest female 1 inch 9 lines.

For "*Anonyx gulosus?* Pl. III. fig. 2," the synonymy gives *Anonyx gulosus*, Kröyer, Sp. Bate, and Boeck; *Anonyx norvegicus*, Lilljeborg, and ? *Anonyx hollbölli*, Sp. Bate, Brit. Mus. Catal., p. 75. The description is followed by these remarks, "I have referred the specimens collected by Mr. Hart with some doubt to the *Anonyx gulosus* of Kröyer, as the antero-lateral margin of the head is less broadly rounded, and the accessory flagellum is longer than that of *A. gulosus* according to Boeck's diagnosis. In the form of the first and second pairs of legs and of the terminal segment they agree well with the descriptions of *A. gulosus*, and particularly in the presence of a tooth on the inner margin of the dactyl, which is mentioned by Lilljeborg as characteristic of that species. From *A. pumilus* they differ in the shorter antennæ, and in the absence of a tooth on the posterior margin of the fifth postabdominal segments."

"*Onesimus Edwardsii*. Pl. III. fig. 3," has for synonymy, "*Anonyx Edwardsii*, Kröyer," "*Lysianassa Edwardsii*, Goës," and "*Onesimus Edwardsii*, Boeck." After the description, Miers says, "the specimens collected differ from Boeck's diagnosis in one particular, the third segment of the postabdomen is slightly produced upwards at the postero-lateral angle. Nothing is said of the form of this segment by Kröyer in his description of the species or in the Latin diagnosis that follows. In Kröyer's figure of the species in the Atlas of the 'Voyage en Scandinavie,' the postero-lateral angle of this segment is represented as not produced upward, but acute. There is, however, a manifest inconsistency between the diagnosis of Boeck and the figures in the Atlas referred to; *e.g.*, in *Onesimus plautus* the third postabdominal segment is described by Boeck as 'sursum productus acutus,' but figured by Kröyer as broadly obtuse and rounded at the postero-lateral angle. *Onesimus edwardsii* has been recorded from Greenland, Spitzbergen, and Britain."

Notes are given upon *Atylus carinatus*, Fabr. To *Acanthozone hystrix* is attached the synonymy, *Acanthosoma hystrix*, Owen and Ross, Bell; *Amphithoë hystrix*, Kröyer, M.-Edw.; *Paramphithoë hystrix*, Bruzelius, Sp. Bate; *Acanthozone cuspidata*, Boeck, *nec* Lepechin; *Acanthozone hystrix*, Miers, Ann. and Mag. Nat. Hist. (ser. 4) xix. p. 137 (1877); with the remark, "in the elaborate plate that illustrates this species in the 'Zweite deutsche Nordpolarf.' [1874], the rostral spine is represented as conical, straight, and acute, and the basos joint of the sixth and seventh pairs of legs as armed with four strong spines upon its

posterior margin. In all the specimens of both sexes that I have examined the rostral spine is laterally compressed and bent near its base, projecting horizontally forwards, and there are but two spines upon the posterior margins of the basos joint of the sixth and seventh pair of legs. It is probable, therefore, that a distinct species is figured by Buchholz in the plate referred to." *Halirages fulvocinctus*, Sars, is next mentioned, followed by *Gammarus locusta*, Linn.; *Gammaracanthus loricatus*, Sabine; *Amathilla pinguis*, Kröyer. *Eusirus cuspidatus*, Kröyer, is thus remarked upon, "The single example in the collection is fully adult and bears ova. Length 1 inch 7½ lines (41 millims.).

"The basos joint of the sixth and seventh pairs of legs is considerably narrowed to its distal extremity. The second and third segments of the abdomen have the posterior margins rounded and very finely serrated. This species has been described at great length and figured by Buchholz, *l. c.*; but either the figure is carelessly executed as regards many details, or it represents a very distinct species. The rostrum is represented as much longer than in the specimens I have seen; the coxa of the fourth pair of legs with its inferior margin straight (not rounded as in the examples I have examined), the second and third segments of the abdomen with the posterior margins strongly angulated, &c."

Notes are given on "*Tritropis aculeata*," chiefly referring to the development of the ovigerous lamellæ in the females.

Ægina spinosissima is given with references to *Ægina spinosissima*, Stimpson, *Caprella spinifera*, Bell, ?*Ægina echinata*, Boeck, *Caprella spinosissima*, Spence Bate. "The largest specimen, length nearly 2 inches 2 lines (54 millims.) is very robust, of a green colour, and with but very few small spines and many indistinct very small tubercles; the second pair of legs has the hand armed upon its inferior margin with two very strong teeth, and a third small tooth close to the distal extremity; the finger is strong and very much curved; the first joint of the first pair of postabdominal appendages is short and much broader than the second joint.

"The smaller specimen, length a little over 11 lines (24 millims.), is of a whitish colour, purplish brown at the bases of the spines, which are numerous, especially on the back. The hand of the second pair of legs is nearly of the same form as in the preceding, but the finger is less arcuate; the basal joint of the second pair of legs not broader than the second joint.

"In the specimens I have before me the teeth on the inferior margin of the palm of the second pair are not only much larger than in *Æ. echinata*, but the palm itself is not tuberculated as in that species, as figured by Boeck (*l. c.*) [pl. 38. fig. 6. 1876]. It is possible that the two forms are distinct; but the variation in the spines of the body and its limbs are known to be very great in some species of the genus.

"Probably the specimens referred by Ross in Parry's 3rd and 4th Voyages to *Caprella scolopendroides*, and which he describes as having 'a great number of small spines along the back,' should be referred to *Æ. spinosissima*. They were collected at Port Bowen and Low Island.

"This species has been recorded from the coasts of Greenland, Spitzbergen, and Norway; and if, as I believe, the species of Stimpson is identical, from the Grand Manan at the entrance of the Bay of Fundy."

1877. Stalio, Luigi.

Catalogo metodico e descrittivo dei crostacei podottalmi ed edriottalmi dell' Adriatico. Estr. dal Vol. III., Serie V degli Atti del R. Istituto Veneto di scienze, lettere ed arti. Venezia, MDCCCLXXVII.

The preface briefly reviews the literature of Adriatic carcinology. The Edriophthalmia are divided into three orders, Amphipoda, Læmodipoda, Isopoda. Among the characters of the

Amphipoda, p. 162, are included "a pair of mandibles with two palps," although on the same page, in the first family, the Orchestidæ, the mandibles are rightly said to be without palps. In the second family, the Gammaridæ, the mandibles are said to be provided with palps; but that is not the case with two of the genera here mentioned, *Probolium* and *Dexamine*. The only other family assigned to the Amphipoda is the Corophidæ. No new species are described or mentioned. *Probolium polyprion*, A. Costa, is given without explanation as a synonym of the later *Probolium megacheles*, Heller. *Elasmopus rapax*, A. Costa, is given as a synonym of *Podocerus largimanus*, Heller, although Heller himself points out that the last uropods and telson of *Elasmopus rapax* do not admit of its inclusion in the genus *Podocerus*, where nevertheless J. V. Carus has since placed it under the name *Podocerus rapax*.

In the Læmodipoda, according to the definition here given, "the mouth is furnished with a circular labrum, with two maxillæ strongly dentate and without palps, and with a pair of maxillipeds provided with palpiform branches." It is possible that by the "due mascelle fortemente dentate e prive di palpi," not maxillæ, but mandibles are intended, but "mandibole" is elsewhere used for mandibles, which in many of the Caprellidæ are furnished with palps, though not in the genus *Caprella*, which alone claims Stalio's notice. In the Caprellidæ he says "l'apparato orale ha la medesima conformazione dei Gammaridi saltatori," probably by this phraseology intending to intimate that in *Caprella* as in *Orchestia* the mandibles are palpless.

1877. Streets, Thomas H.

Contributions to the Natural History of the Hawaiian and Fanning Islands and Lower California, made in connection with the United States North Pacific Surveying Expedition, 1873–75. Bulletin of the United States National Museum. No. 7. Washington, 1877. Amphipoda, pp. 124–138.

The lower antennæ and "posterior stylets" which were missing in Dana's specimen of *Clydonia longipes* are here described. *Lestrigonus rubescens*, Dana, is reported. *Hyperia tricuspidata*, n. s., is described, in which the first gnathopods have "the meros produced antero-inferiorly," "carpus broad, produced inferiorly, but not anteriorly," while "the second pair has none of the joints produced." "When the animal is at rest, the inferior antennæ are evidently folded up, ... in the concavity in the front of the head." At the end of the description the opinion is urged that the genus *Lestrigonus* should be retained, instead of being regarded merely as the male sex of *Hyperia*, but the argument seems to rest entirely on the account given of the inferior antennæ in the male of the so-called *Hyperia tricuspidata*, which, however, with its folded antennæ, cannot be a *Hyperia*, but must belong to the Platyscelidæ. *Phronima pacifica*, n. s., is described from the "North Pacific Ocean. Latitudes 4° and 21° north; longitudes 127° and 151° west." "This species is distinguished from *P. sedentaria* by the broadly-quadrate form of the carpus of the third pair of thoracic feet, and by having the carpus of the gnathopoda less produced anteriorly. In other respects they are similar. The shape of the hand more nearly resembles the hands of *P. custos* and *P. borneensis*: but it is distinguished from both of the latter, by the character of the anterior surface of the carpus and of the propodus. In the latter both the carpus and propodus are furnished with a crenulated tubercle; in *custos* the tubercle is single and tooth-like. There is a striking resemblance between the propodus, and the anterior surface of the carpus of the third pair of thoracic feet, of the smaller specimens of *pacifica*, and the corresponding parts of *P. atlantica*, which is said to be the female of *sedentaria*: the broad hand, however, separates them. It is a remarkable fact, that in all the species of *Phronima*

that have been described, even from widely-separated localities, the variation is very slight indeed." See also Note on Streets, 1882.

Anchylomyx, new genus, is thus described:—"Head moderately large, broad and rounded at the top, tapering inferiorly to the oral apparatus, and excavated in front. Eyes on the lateral and dorsal surfaces of the head. Both pairs of antennæ present, long; base of the superior pair long and stout, three-jointed; inferior pair slender, four-jointed. Flagellum very attenuated and elongated. Thorax broad, somewhat compressed; segments six. Abdomen narrow. The gnathopoda not subchelate, nor much reduced in size, when compared with the following feet; the first and second pairs of thoracic feet long, slender; carpus and meros linear. The third pair enlarged; carpus and meros dilated, with the anterior margin armed with teeth; propodus flexes on the carpus, impinging against the teeth on its anterior margin; dactylus fused with the propodus. The fourth and fifth pairs of feet subequal, shorter than the preceding. The three posterior pairs of abdominal appendages biramous, lanceolate; rami pointed." In the additional observations it is noted that "the mandibles are without appendages," and that, as in *Phronima*, "a pair of wing-like plates exist at the base of the dactylus of both pairs of gnathopoda."

The type species is *Anchylomyx hamatus*, but in 1882 Dr. Streets makes it a synonym of *Phronima elongata*, Claus, 1862, and *Phronimella elongata*, Claus, 1872.

Anchylomera thyropoda, Dana, is reported, with the additional observation that "the inferior distal angle of the propodos of the third and fourth pairs of thoracic feet is produced, and when the joint is flexed this projection impinges against the antero-inferior angle of the carpus."

Platyscelus batei, n. s., is described, with the remark that "this species is closely related to *P. rissoinæ;* the differences are chiefly in the structure of the gnathopoda, and of the third and fourth pairs of thoracic feet. The gnathopoda bear a striking resemblance to those of the young of *P. serratus*, but as the rest of the structure of the animal shows no evidence of immature development, this is undoubtedly their normal adult condition." Yet, as the length is given as ".12 of an inch," and the inferior antennæ are said to be short, the specimen could scarcely be full-grown, and the independence of the species is therefore very doubtful. *Platyscelus serratus*, Bate, is regarded by Claus as a synonym of *Typhis oroides*, Risso, and *Platyscelus rissoinæ* as perhaps a synonym of his own *Eutyphis armatus*. Dr. Streets' work does not seem to have come under the notice of Claus. *Amphipronoë serrulata*, n. s., is described, and *Oxycephalus tuberculatus*, Sp. Bate, a species which Claus identifies with *Oxycephalus piscator*, Milne-Edwards.

The new genus *Leptocotis* is thus described:—"Animal long and slender. Head large and produced anteriorly into a rostrum; narrowed behind the eyes; the constricted portion short, and not narrower than the thorax; under surface excavated anteriorly on each side for the reception of the superior antennæ. Superior antennæ short, sickle-shape. Inferior antennæ five-jointed, folded upon themselves four times, and concealed beneath the head; first and second joints distally enlarged. An elongate mandibular appendage. Gnathopoda short, and complexly chelate. Third and fourth pairs of thoracic feet having the coxæ dilated; the fifth pair small. Fourth and fifth abdominal segments fused into one; sixth small. Caudal appendages long, biramous. Telson cylindrical, long." The type species, *Leptocotis spinifera*, is described in detail.

This genus, Dr. Streets says, exhibits a remarkable blending of the characters of *Oxycephalus* and *Rhabdosoma*. Much the same is said by Claus of his species *Oxycephalus tenuirostris*, 1871, to which, in 1887, he makes *Leptocotis spinifera*, Streets, a synonym, without explaining why he rejects the genus *Leptocotis*. Streets here speaks of "a long, acute spine, pointing upward, on each side of the fifth" segment of the abdomen. In 1878, he says nothing of this, but describes "the first three segments of the abdomen subequal,

inferior margins finely serrated, the third segment with the postero-inferior angle produced into a long, spinous process, the angle of the first and second segments square behind, not produced." Claus, on the other hand, for his species gives "die Seitenflügel der Abdominal-segmente unbewaffnet," yet he figures the postero-inferior angle of the third pleon-segment produced into a sharp point, the same angle on the two preceding segments being well rounded.

1877. Théel, Hjalmar.

Relation de l'expédition Suédoise de 1876 au Yenissei. Upsala, 1877. p. 33.

"*Gammarus pulex* found in lakes of the Tundra, near Dondino, Siberia, at 69° N. lat." (Dr. von Martens, Zool. Record for 1877.)

1877. Thomson, C. Wyville.

The Voyage of the 'Challenger.' The Atlantic. A preliminary account of the general results of the exploring voyage of H.M.S. 'Challenger' during the year 1873 and the early part of the year 1876. Vol. I. London, 1877.

There is but one passage specially referring to the Amphipoda (pages 129–132). On January 28, 1873, the trawl was employed successfully "at a depth of 1090 fathoms, about 90 miles to the south-east of Cape St. Vincent." "The trawl on this occasion contained a single example of the female of a very large amphipod crustacean, briefly described under the name of *Cystosoma neptuni* by Guérin-Méneville from a single specimen obtained in the Indian Ocean. We have since taken several specimens at different stations in the Atlantic; and as a small male was in one case captured in the towing-net, there can be little doubt that, like *Phronima*, to which genus it is allied, *Cystosoma* is a pelagic animal, probably retiring during the day to a considerable depth, but occasionally coming to the very surface of the water. The male example figured (Fig. 27), which is 103 mm. in length, was taken in Lat. 1° 22′ N., Long. 26° 36′ W., a little to the east of St Paul's Rocks, where the depth was 1500 fathoms.

"The animal presents a very remarkable appearance. It is absolutely colourless and transparent, so that by transmitted light the internal organs can be perfectly seen through the test—the cephalic ganglion with the nerve-fibres running to the antennæ and the eyes; the ganglia of the double ventral cord with the filaments passing to the appendages; the heart, an elongated tube with three openings; the stomach, a large sac with a small intestine leading from its base to the excretory opening in the telson; in the female two large rose-coloured ovaries, the oviducts passing to an opening covered by two small lamellæ, at the base of the first segment of the pereion; in the male two elongated testes, their ducts opening between the appendages of the seventh segment.

"The head is large and greatly inflated, and its upper surface is entirely occupied by two enormous facetted eyes, reminding one of the eyes of *Æglina* among trilobites. There are two rows of spines along the lateral borders of the head, and some spines are placed round the mouth, which is in the usual position at the base of the cephalic segment on the lower surface of the body. The first pair of antennæ only are developed in either sex. The antenna consists of two joints, and is attached to the anterior margin of the head.

"The parts of the mouth and the maxillipeds are very small; the two gnathopods are terminated by claws as in the Typhids, and act functionally as second and third maxillipeds.

"The pereion consists of seven segments; and the pleon of five, to the two last of which the

caudal appendages are attached. The five pairs of ambulatory legs are long and slender, and the three pairs of 'swimmerets' are normal. The eggs are large and few in number; some of those observed contained embryos in which nearly all the appendages were developed, showing that the young undergo no metamorphosis.

"Dr. von Willemoes-Suhm, who has carefully described this singular form, has proposed to establish for the genus a family CYSTOSOMIDÆ, holding a place intermediate between the TYPHIDÆ and the PHRONOMIDÆ."

A casual allusion to Amphipods occurs on p. 388.

1877. WOODWARD, HENRY.

A Catalogue of British Fossil Crustacea, with their synonyms and the range in time of each genus and order. London, 1877.

The notices of Amphipoda in this work are as follows:—Introd., p. vi. "The order Amphipoda has one representative in the Upper Silurian (the *Necrogammarus Salweyi*, H. Woodw.); it is represented by *Gampsonyx* in the coal of Rhenish Prussia, and by the genus *Prosoponiscus* in the Permian of Durham. Other (Secondary) species occur in Bavaria, etc. The living genera of Amphipoda are abundant, both marine and freshwater; and some species are even terrestrial in their habits."

The table of genera and species, etc., on p. viii., assigns but one genus and one species to the British fossil Amphipoda.

Page 62 gives "Order V. Amphipoda.

"Prosoponiscus, Kirkby, 1857.

"*Trilobites*, Schloth. 1820, Petrefact. p. 41.

"*Prosoponiscus*, Kirkby, 1857, Quart. Journ. Geol. Soc. vol. xiii. p. 214; Spence Bate, 1859, ib. vol. xv. p. 137.

"*Distribution.* Permian.

"Prosoponiscus problematicus, Schloth. sp. 1820. Magnesian Limestone, Durham.

"*Trilobites problematicus*, Schloth. 1820, Petrefact. p. 41.

"*Prosoponiscus problematicus*, Kirkby, 1857. Quart. Journ. Geol. Soc. vol. xiii. p. 214, pl. vii. figs. 1–7; Spence Bate, 1859, Quart. Journ. Geol. Soc. vol. xv. p. 137, pl. vi. figs. 1–7."

In regard to the above, see Notes on Schlotheim, 1820, 1822; Schauroth, 1854; Kirkby, 1857; Woodward, 1871.

1877. WRZEŚNIOWSKI, AUGUST.

Ueber die Anatomie der Amphipoden. Protocolle der Sitzungen des Section für Zoologie u. vergleichende Anatomie des V. Versammlung russischer Naturforscher u. Aerzte in Warschau in September 1876, mitgetheilt von Prof. Hoyer. Zeitschrift für wissenschaftliche Zoologie. Achtundzwanzigster Band. Leipzig, 1877. pp. 403–404.

Synurella polonica, a new genus and species, is here introduced, but not described, since the account of its circulation can scarcely stand either for generic or specific description. The name *Synurella* was afterwards, with perhaps unnecessary purism, changed to *Goplana*. The change indeed would have scarcely been legitimate, had *Synurella* at its first introduction been attended by sufficient description to give it a status in scientific nomenclature. The interesting details in regard to the heart, etc., were subsequently repeated with improvements. Reference is made to "*Callisoma Braniekii*," earlier described, and to "*Hyale Jelskii*" described subsequently.

1878. Bate, C. Spence.

Two new Crustacea from the coast of Aberdeen. Annals and Magazine of Natural History for May, 1878. p. 411. Fig. 2.

The new species *Lestrigonus spinidorsalis*, closely resembling *Lestrigonus exulans*, differs from any species of the genus known to Mr. Spence Bate in having the last two somites of the pereion and the first three of the pleon produced in the median line of the dorsal surface posteriorly to a sharp-pointed tooth or spine. [Surely this is *Parathemisto compressa* (Göes) 1865.]

1878. Bate, C. Spence.

On the Willemoesia Group of Crustacea. Annals and Magazine of Natural History for December, 1878. pp. 484–489.

The name *Lestrigonus spinidorsalis* is here altered to *Hyperia* (*Lestrigonus*) *spinidorsalis*, since *Hyperia* is the older name, and *Lestrigonus* is probably founded not on specific but sexual differences, containing the male forms, as suggested in the British Museum Catalogue, 1862.

1878. Bate, C. Spence.

The Crustacea in Couch's Cornish Fauna revised and added to by C. Spence Bate, F.R.S. 1878. *Reprinted from Part II, No. XIX. Journal Royal Institution of Cornwall.*

The Amphipoda, pages 43 to 62, are not a revision of Couch's work but an addition, taken from Mr. Spence Bate's own writings. On page 47 the genus *Grayia* is given as *Graya*. There is reason to believe that this only represents the young of *Amathilla homari*. *Acanthonotus owenii* is here said to have been taken from *Maia squinado*, but the remark properly applies to *Isæa montagui*, Milne-Edwards, as may be seen in the Brit. Sess. Crust., i. p. 216. *Siljeborgia* is printed by mistake for *Liljeborgia*.

1878. Bate, C. Spence.

Report on the present state of our knowledge of the Crustacea. Part III. On the homologies of the dermal skeleton (*continued*). [*From the* Report *of the* British Association *for the* Advancement *of* Science *for* 1877.] London, 1878. pp. 36–55.

In discussing the first pair of antennæ, Mr. Spence Bate remarks that "in Amphipoda there is never more than one secondary appendage, and that is always of a rudimentary character, and frequently only determinable in the very young stage of the animal and obsolete in the adult." Dybowsky, however, among the *Gammari* of the Baikalsee found the secondary appendage sometimes consisting of forty articulations, and therefore scarcely to be called rudimentary. "As we descend," Spence Bate observes, "in the scale of Crustacean forms the antennæ naturally become simplified; but as they lose their internal structural character they increase their external functional arrangement. Thus in Amphipoda the auditory chamber and otolithes are wanting, but in all the aquatic normal forms the

filaments are long, and richly studded with those membranous organisms that I have named *auditory cilia*." The discovery by Claus of otoliths in the Oxycephalidæ is not noticed.

In speaking of the second pair of antennæ, Spence Bate says, "in the Amphipoda this antenna is simple and normally well defined, the five joints of the peduncle and the flagellum being separate and distinct." But according to my experience the two first joints of the peduncle are as a rule more or less fused together.

"Among the Hyperidæ," he further says, "the [second] antenna is considerably impoverished, and in many genera it is rudimentary, while in *Phrosina* it appears to be absent." In regard to *Phrosina*, however, I may state that I have just received (June 27, 1887) from Dr. Bruce specimens taken at Malta, of *Phrosina semilunata*, Risso, ♂, in which both pairs of antennæ are well developed with long flagella.

The three sections of this paper are headed respectively "Correlation of Appendages," "On Exuviation," and "On Renewal of Appendages."

1878. Bovallius, Carl, born 1849 (Hj. Théel).

Notes on *Pterygocera arenaria*, Slabber. (Bihang till Svenska Vetenskaps-Akad. Handlingar, IV, No. 8), pp. 1–27, pls. 1–4. 1878.

It has been shown by S. I. Smith that the names *Sulcator*, Sp. Bate, 1854, and *Pterygocera*, Latreille, 1825, must yield to the earlier name, *Lepidactylis*, Say, 1818, but in my opinion the name *Haustorius*, proposed by P. L. S. Müller in 1775, has the preference over all its competitors. The elaborately and beautifully illustrated notes by Bovallius (in English) open with an account of the adventures of Slabber's species, not however taking into account *Lepidactylis dytiscus* of Say. A chronological list of the literature is given, with a corresponding omission. A new subfamily is created, Pterygocerinæ, thus defined :—

"Cephalon rostrum ferens minimum, articulum primum antennarum non tegens.
"Labium superius breves, apice rotundatum.
"Mandibulæ magnæ, palpo elongato, articulo palpi secundo tertio longiore.
"Maxillæ primi paris parvæ, palpo biarticulato.
"Pedes maxillares palpo laminari.
"Antennæ superiores flagello appendiculari instructæ.
"Gnathopoda primi paris dactylo unguiculato, secundi paris dactylo minimo duplici.
"Pereiopoda primi et secundi paris articulis ultimis ligulas formantibus.
"Pereiopoda sequentia dactylis carentia.
"Telson simplex.
"Corpus non valde compressum.

"The family Pterygocerinæ is distinguished from the Pontoporeiinæ and Phoxinæ by its general form as well as by the abnormal structure of the dactyli of the gnathopoda. Another remarkable character is presented by the peculiar form of the carpus and propus of the first and second pairs of the pereiopoda, which I have thought proper to denote as spoon-shaped 'liguliformis.' Pterygocera differs, moreover, from the Phoxinæ by the second joint of the mandibular palpus being larger and longer than the third, and also by the telson not being bifid, but simple and only incised."

In the very full and detailed account of the species it is mentioned that "with the age of the animal the size of the eyes diminishes also, and in the oldest they are discovered only with difficulty. The pigment is red, the eye-lens short, thick, bluntly conical, the surface of the eye irregularly facetted."

1878. Catta, J. D.

Sur un Amphipode nouveau, le Gammarus Rhipidiophorus. Actes de la Société Helvétique des Sciences naturelles réunie à Bex les 20, 21 et 22 août 1877. 60e session. Compte-rendu 1876/1877. Lausanne, 1878. pp. 257–263.

The Amphipod in question has been only found in a well at La Ciotat (Bouches-du-Rhône, France), a hundred yards or so from the Mediterranean. The water of the well becomes brackish in summer. Professor Catta observes that in the carpus and propodus of the first peræopod his new species has, with exaggerated development, a character common also to *Gammarus pulex* and *Gammarus locusta*, in that these joints are "garnis d'immenses poils plumeux disposés par rangées transversales et entremêlés de piquants." From the sweeping movement of these setæ he formulates the name "*Rhipidiophorus* (ῥιπίδιον, *balai de plumes*)." The first peræopod in this species, he says, is much longer than the second; the first uropods are much shorter than the second; the third are enormous, whether compared with those that precede or with the size of the animal, and have one branch rudimentary; the other branch "garnie de nombreuses rangées de grandes soies et de piquants, est composée de deux articles dont le dernier est assez réduit."

An argument follows to show that the genus *Niphargus* ought to be again merged in *Gammarus*. It is urged that in *Gammarus pulex*, and in *Gammarus neglectus*, Sars, one ramus of the third uropod is biarticulate, as in *Niphargus;* that Humbert's "*Niphargus puteanus*, var. *Forelii*" has "des poils et des poinçons sur le bord postérieur des derniers Somites," as in *Gammarus;* that the presence or absence of eyes is not of great importance; and that the telson is practically alike in the species assigned to both genera. As to the dorsal hairs and prickles, he says, "*G. Rhipidiophorus* qui est Niphargus par les antennes, le cinquième Siagonopode et le Pléon, porte aussi ces poils et ces piquants." It may, on the other hand, be argued that in *Niphargus aquilex* the biarticulate ramus of the third uropods is strikingly distinguished from that in any species of *Gammarus* by the length which the second articulation attains, as well as by its cylindrical shape. The discovery of transition-forms between two genera will always cause some difficulty, but as such forms have probably existed in innumerable cases where they have not been discovered, it is a question how far the discovery of them should be allowed to interfere with well-established distinctions either of genera or species. When *Niphargus aquilex* and *Gammarus pulex* are side by side, it is rather the difference of the *facies* than the likeness which attracts attention.

1878. Chatin, Joannes.

Recherches pour servir à l'histoire du batonnet optique chez les crustacés et les vers. (Suite 1). Annales des Sciences naturelles. Sixième série. Zoologie. Tome VII. Paris, 1878.

Accounts are given of the eye in *Lysianassa spinicornis*, Costa, fig. 24; *Isæa nicea*, Thor., fig. 25, 26; *Caprella acanthifera*, Leach, figs. 28, 29; *Epimeria*, nov. sp., Catta, figs. 30–34. This new species lives parasitic upon *Suberites domuncula*, Nardo. The pigment-sheath is rouge vif, while other species of *Epimeria* have it brown, and others again almost black. The genus, he thinks, requires a complete revision.

1878. Claus, C.

Ueber Herz und Gefäss-system der Hyperiden. Zoologischer Anzeiger. 1. Jahrgang. No. 12. Leipzig, 1878. pp. 269–271.

He here notices the two lateral pairs of arteries belonging to the heart of *Phronima*, which he had at one time supposed to be merely strings of connective tissue. The same pairs of vessels, he says, are found also in *Phronimella*, and in two new Mediterranean Phronimidæ from Messina, for which he institutes the new genera *Phronimopsis* and *Paraphronima*. In the latter genus there is a third pair of arteries in the fifth peræon-segment. This he finds also in *Phrosina*, *Hyperia*, *Oxycephalus*, *Thamyris*, *Platyscelus* (*Typhis*) and *Vibilia*. He is inclined to consider three pairs (in the third, fourth, and fifth segments) the normal number for the Platyscelidæ and Oxycephalidæ, especially as three is the prevailing number for the pairs of venous ostia (in the second, third, and fourth segments) in the Phronimidæ and Gammaridæ. Sometimes the first pair of ostia is wanting, and sometimes the third pair of arteries. "Two pairs," he says, "of lateral slits, which then uniformly belong to the third and fourth peræon-segments, I find in almost all Platyscelidæ, *e.g.*, *Typhis*, *Lycæopsis*, n. gen., and in *Oxycephalus*, *Vibilia*, and *Hyperia*."

He assigns three pairs of lateral ostia (in the second, third, and fourth peræon-segments) alike to the Gammaridæ and Caprellidæ. In the genus *Tanais* the elongate heart is, he says, quite Amphipod-like in its relations, but has only two lateral openings in the third and fourth very elongate peræon-segments.

The heart as a rule runs from the beginning of the first to about the middle of the sixth peræon-segment, but in *Oxycephalus* the cephalic aorta begins at the beginning, and in *Typhis* and *Lycæopsis* at the end of the second segment. The two pairs of valves are described which are found at the origin both of the cephalic and abdominal aorta, and some other details are entered into.

1878. Dezsò, Béla.

Ueber den Zusammenhang der Kreislaufs- und respiratorischen Organe bei den Arthropoden. Zoologischer Anzeiger. I. Jahrgang. Leipzig, 1878. p. 274.

The general results only of Dr. Dezsò's investigations are given in the following terms :—

"Bei *Crustaceen*, die ihre Kiemen als Körperanhänge an der Bauchseite des Abdomens und Postabdomens haben, kommen ebenfalls so viele Paare von Spalten am Dorsalgefässe vor, wie viele Paare von Kiemen existiren.

"Bei *Crustaceen*, die ihre Kiemen unter der Thoraxschale beherbergen, kommen am Herzen so viele Paare von Spalten vor, wie viele Paare von Kiemen sich unter der Thoraxschale vorfinden."

These results do not seem to tally with those arrived at by Fritz Müller, Claus and Delage, with regard to the heart in the Amphipoda, among which five pairs of branchiæ are commonly combined with three pairs of lateral slits in the heart.

1878. Forel, F. A.

Faunistische Studien in den Süsswasserseen der Schweiz. Zeitschrift für wissenschaftliche Zoologie. Dreissigster Band. Supplément. Leipzig, 1878. pp. 383–391.

In respect to the general conditions of life in a fresh-water lake he distinguishes three regions, "die *littorale*, die *pelagische* und die *tiefe* Region." The deep fauna is tolerably rich in

species and in number of individuals; most types of fresh-water animals have their representatives there (mit Ausnahme der Najaden und der Spongien). In this region in the Lake of Geneva he found, among others, "*Niphargus puteanus*, var. *Forelii*, Al. Humbert." References are given to Professor Forel's earlier writings on lake-fauna.

1878. Gamroth, Alois.

Beitrag zur Kenntniss der Naturgeschichte der Caprellen. Mit Tafel VIII–X. Zeitschrift für wissenschaftliche Zoologie. Einunddreissigster Band. Leipzig, 1878. pp. 101–126.

The investigations were made on "Caprella æquilibra Sp. B. (?)." Its food Gamroth considers to be the larvæ of Bryozoa and perhaps the adult Bryozoa likewise. The work is one of importance, discussing the whole organisation of the creature in question, but it has been to some extent superseded by the later labours of Paul Mayer and Delage. Mayer points out that Gamroth erroneously attributes only one joint, instead of two, to the flagellum of the lower antennæ in *Caprella æquilibra;* that he figures on the first maxilla an inner basal plate (Kaulade) with setæ, as found in the normal Amphipoda, but not present in any of the Caprellidæ with which Mayer is acquainted; and that he leaves unnoticed the want of symmetry in the mandibles, and makes no mention of the Paragnath (lower lip). He calls the hairs on the lower antennæ "Strudelorgane," a term which Mayer considers appropriate, as well as Haller's "Ruderhaare," and "Fangorgane" which would suit Gosse's description. The "Frontal organ" or "Nackenorgan," which Gamroth discovered, one on either side the median line of the body, in front of the brain, and above the origin of the upper antennæ, is considered by Mayer to be a gland rather than, as Gamroth suggested, an organ of sense. His mistake in supposing that the colouring matter was in the epidermis instead of under it, is explained by Mayer by the fact that the Chromatophores do push excrescences in between the cells of the epidermis, giving an appearance as if the epidermis were itself pigmented.

1878. Gegenbaur, Carl.

Grundriss der vergleichenden Anatomie. 2te Aufl. 1878.

Elements of Comparative Anatomy. By Carl Gegenbaur, Professor of Anatomy and Director of the Anatomical Institute at Heidelberg. Translated by F. Jeffrey Bell, B.A., Magdalen College, Oxford. The translation revised and a preface written by E. Ray Lankester, M.A., F.R.S., etc. London, 1878.

The Arthropoda occupy the fifth section, pages 228–305. The Crustacea are divided into *a*) Entomostraca, *b*) Malacostraca. The latter are divided into 1. Thoracostraca (Podophthalma), and 2. Arthrostraca (Hedriophthalma). The latter are exhibited as follows:—

"Amphipoda. *Gammarus, Orchestia, Hyperia, Phronyma.*

"Læmodipoda. *Caprella, Cyamus.*

"Isopoda. *Bopyrus, Cymothoa, Sphæroma, Oniscus, Asellus, Idothea.*"

In the preface, pages xiii–xv, there are some important remarks on "Nomenclature of the Parts of the Digestive Tract." Mr. Lankester proposes "to distinguish the primitive digestive space which develops from the endoderm (in fact the gastrula stomach) as the 'enteron.' The anterior passage leading into this from the mouth, and formed by an ingrowth of

ectoderm," he says, "I have termed the 'stomodæum,' and the corresponding passage leading from the anus I similarly propose to call the 'proctodæum.' These three primary factors of the alimentary tract are most equally developed in the Arthropoda and some Mollusca."

In Professor Lankester's Classification the Arthropoda are the "Branch. Gnathopoda" of the "Appendiculata," which "include animals with lateral locomotive appendages, and usually a segmented body," a group, "excepting that it has the addition of the Rotifera, nearly coextensive with the Annulosa" of Huxley's Classification in 1869.

1878. Godet, Paul.

Note sur le *Gammarus puteanus*. Bullet. de la soc. des Scienc. nat. de Neufchatel. XI. 2. pp. 284–5. 1878.

Gives measurements. See also Note on Godet, 1873, in Appendix.

1879. Haller, Gottfried Otto, born May 30, 1853, died May 1, 1886 (Mlle. A. Haller).

Vorläufige Notizen über die Systematik der in Mittelmeer vorkommenden Caprelliden. Zoologischer Anzeiger. II. Jahrgang. Leipzig, 1879. pp. 230–233.

Short descriptions are given of the following species, *Protella major*, n. s., subsequently recognised by Haller as the male of *Protella phasma*, Montagu; *Caprella liparotensis*, n. s.; "*Caprella Helleri*," n. s.; "*Caprella Dohrni*," n. s.; *Caprella elongata*, n. s., for which, and for the two preceding, see the next Note; *Caprella antennata*, n. s., identified with *Caprella acanthifera* by Mayer, who notices that Haller himself does not again mention this species; and lastly, "*Podalirius Krögeri*," n. s.

1879. Haller, G. O.

Beiträge zur Kenntniss der Læmodipodes filiformes. Mit Tafel XXI.–XXIII. Zeitschrift für wissenschaftliche Zoologie. XXXIII. Band. Leipzig, 1879. pp. 350–422.

Of the genera *Podalirius*, *Proto*, *Protella*, and *Caprella*, Dr. Haller found *Protella* most, *Podalirius* least, suited for his anatomical investigations. His discussion of the nerve-system should be read under the light thrown by Mayer's later investigations. In the section headed "Sinnesorgane," Haller denies the existence of the "trichterförmige Frontalorgan" which Gamroth discovered lying immediately behind the origin of the upper antennæ. But the existence of this frontal- or nuchal-gland is reaffirmed by Mayer. After the discussion of various hairs destined for sensation, Haller gives in his third section, "Einige mikroskopische Beobachtungen über Haargebilde, welche theils zum Ergreifen und Festhalten, theils zum Schwimmen dienen." While, he says, the upper pair of antennæ is "stets und überall Sinnesorgan," and therefore beset with all sorts of hairs for purposes of sensation, the hinder pair does not always agree with it in this purpose. It often loses almost entirely the importance of an organ of sense, and by way of compensation becomes destined to support the organs of locomotion. Hence arise swimming-antennæ, as among the Copepoda. In the genus *Caprella* it is possible to form two subgenera, one with the lower antennæ acting as organs of sense, the other in which they have become swimming organs. In this

latter case they have the whole under side closely set with long stiff hairs, arranged in two simple rows. These swimming-bristles are movably socketed, and on each joint increase in size from behind forwards. Their peculiar structure is described. The structure, positions and uses of various spines are investigated.

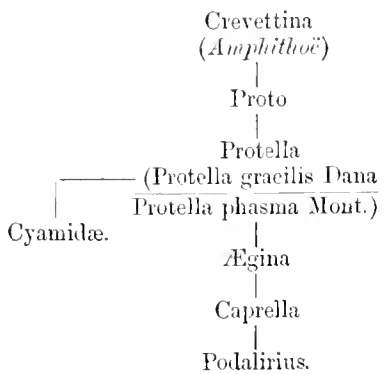
Sections of the work are devoted to the heart and circulation, the organs of reproduction, the apparatus of nutrition and glands of the intestine, a gland in the hand of the second gnathopod of some Caprellidæ (*e.g.*, *Caprella dohrnii* and *Protella phasma*), remarks on large connective-tissue cells in the bodies of the Caprellidæ, sexual differences, adaptability, mode of life, epizoic plants and animals, classification.

Proto pedata, Fleming, and "Proto Goodsiri," Spence Bate and Westwood, (Figs. 23–25), are given as distinct species, but the better opinion unites them under *Proto ventricosa*, O. F. Müller. *Proto brunneorittata*, n. s., is described and figured. Remarks are made on the genus *Protella*, Dana, and the species *Protella phasma* (Fig. 26). *Caprella*, Lamarck, is defined, and in "Subgenus I. Caprellen, deren unteres Fühlerpaar Ruderborsten trägt," he places 1. *Caprella æquilibra;* 2. *Caprella acutifrons;* 3. *Caprella liparotensis*, n. s. (Figs. 41, 42), which is described in detail; 4. "*Caprella Helleri*," n. s. (Fig. 43), which Mayer considers to be the young form of some *Caprella* which cannot be determined.

In "Subgenus II. Die unteren Antennen sind Sinnesorgane." Here are placed, 5. *Caprella linearis;* 6. "*Caprella Dohrnii*," n. s. (Fig. 44), which is given by Mayer as a synonym of his subsequently published *Caprella grandimana;* 7. *Caprella acanthifera*, Leach; 8. *Caprella elongata*, n. s. (Fig. 45), which Mayer considers to be a smooth variety of *Caprella acanthifera*.

Of *Podalirius*, Kröyer, two species are given, *Podalirius typicus*, Kröyer, and *Podalirius kröyeri*, n. s. (Figs. 46–49), both species being described in detail.

In the conclusion, Haller draws out the following genealogical tree of the Caprellidæ, which he regards as probably Crevettina metamorphosed by a parasitic mode of life.



1878–1879. HAYEK, GUSTAV VON.

Handbuch der Zoologie. Siebente, (des II. Bandes erste) Lieferung. Wien, 1878. Achte (des II. Bandes zweite) Lieferung. Wien, 1879.

Von Hayek divides the "Unterreich, *Arthropoda*, Gliederfüssler," into four classes, Crustacea, Arachnoidea, Myriopoda, Insecta. In the higher forms, he says, the body is clearly divided into three principal sections, constituting the head, thorax, and abdomen, but "bei den Krebsthieren, als den niederst organisirten Gliederfüsslern, ist eine derartig ausgesprochene Sonderung niemals zu bemerken, sondern eine mehr oder weniger weitgehende Verschmel-

zung des Kopfes mit den folgenden Segmenten, und wäre es auch nur das vorderste des Bruststückes, der sogenannten Prothorax, zur Regel geworden." He divides the Crustacea into seven orders, the Amphipoda standing sixth, between the Isopoda and Decapoda. At page 89 he defines the Amphipoda (Flohkrebse), as "Getrennt-schechtliche Krebsthiere mit entwickeltem Bruststücke, von den Seiten her zusammengedrücktem Leibe, und kiemenlosen Postabdominal-Gliedmassen." The illustrations are taken from "*Amphithoë Jurinii*," M.-Edw.; *Gammarus neglectus*, Lillj.; *Gammarus locusta*, Montagu; *Caprella linearis*, L.; and *Phronima sedentaria*, Forsk. Fig. 10–14, "*Gammarus neglectus*, Lillj. Partie eines sehr vergrösserten Embryos," exhibits the heart with six "seitliche Spaltöffnungen." Of the eyes it is said, "Die zusammengesetzten, sitzenden Augen werden von der zu einer Hornhaut umgewandelten, ganz glatten, niemals facettirten Körperdecke überzogen."

1878–1879. KIRK, T. W., born 1856 (Chilton).

Additions to the Crustacean Fauna of New Zealand. The Annals and Magazine of Natural History. Vol. II. Fifth Series. London, 1878. pp. 465–466.

On Additions to the Carcinological Fauna of New Zealand. [*Read before the Wellington Philosophical Society, 31st August.* 1878.] Transactions of the New Zealand Institute. Vol. XI. pp. 392–397. 1879.

"*Caprella novæ-zealandiæ*, sp. nov.," is described. It is said to approach "*C. geometrica*, Say, from which it differs, however, in the form of the spine on the cephalon, in the length of the antennæ, and in the articulation and arming of the second pair of gnathopoda." Mayer considers that this, together with *Caprella caudata*, G. M. Thomson, is probably a local variety of *Caprella æquilibra*, Say. A second species is described as "*Caprella lobata*, Guérin."

In *Notes on Some New Zealand Crustaceans*, [*Read before the Wellington Philosophical Society, 11th January*, 1879]. Trans. N. Z. Inst. Vol. xi. pp. 401–402, Mr. Kirk mentions the capture of *Podocerus cylindricus*, Say, and *Pleustes panoplus*, Kröyer, at Worser Bay. He says, "these are both Arctic species, and their occurrence on our coast is somewhat remarkable." It has since been suggested that the *Pleustes* is a variety.

1878. LEYDIG, FRANZ.

Ueber Amphipoden und Isopoden. Anatomische und zoologische Bemerkungen. Zeitschrift für wissenschaftliche Zoologie. XXX. Bd. Suppl. pp. 225–274. Mit Tafel IX–XII. Leipzig, 1878.

On the antennæ of the Amphipoda, Leydig distinguishes:—

1 Gewöhnliche Borsten. These ordinary bristles, for most of their length dark-rimmed, but with bluntish ends of finer, clearer structure, and often a fine hair given off some way short of the termination, are found on other parts of the body as well as the antennæ.

2. Fiederborsten. These plumose bristles, spoken of by Humbert as "capsules sensitives," may, Leydig says, be sensitive, but they are not capsules, they are modified pores (Hautcanäle). For the explanation of the like in other Crustacea and in insects, he refers to his own work Ueber Geruchs- und Gehörorgane der Krebse und Insecten., Archiv f. Anat. u. Physiol., 1860. Between this and the preceding class he places a sort of Halbfiederborsten, such as are found on the rim of the head and the back of *Gammarus puteanus*.

3 Cylinder oder Keulen. In these cylinders or clubs, the end swelling into a sort of knob

shows a pale, fine structure, but no opening. They may be seen on the flagellum of the lower antennæ of *Gammarus puteanus*.

4. Riechzapfen. These olfactory tubes are on the flagellum of the upper antennæ. They have a narrower dark-rimmed stem and a paler, broader body, in which there is a slight indentation at about midway. A cloud of fine granular substance may sometimes be seen issuing from the terminal aperture.

5. Schuhartige Anhängsel. Calceoli. These shoe- or slipper-like stalked appendages are supposed to belong only to the lower antennæ of the male, but it is now known that they occur on both pairs of antennæ and in both sexes.

In the ordinary bristles, called by de Rougemont tactile bristles, Leydig could not find a nerve, though inclined to regard both the bristle and still more the fine offshoot near the tip as the sheathing of a nerve-end. That Claus should have seen the nerve in other Crustacea [the Argulidæ] he thinks open to doubt. This doubt Claus criticizes in "der Org. d. Phron. p. 10–11, n. The plumose bristles Leydig had always regarded as tactile bristles, having in other subjects shown how they were placed upon indubitable ganglia. If the view of recent observers, that these are auditory hairs, be justified, the sense of sound, Leydig infers, must be distributed over a considerable portion of the surface of the body, a conclusion not of necessity to be rejected.

He defends his attribution of an olfactory function to the "Riechzapfen" against the objections of Graber in 1877. In the lower animals he considers that the different senses are not necessarily very sharply distinguished, so that one and the same nerve-end-apparatus may serve for the sense of touch, taste and smell, may even not be quite inaccessible to light and sound. He illustrates his meaning by the popular use of the German word "Wittern" (compare English "savour") employed sometimes of taste and sometimes of smell.

In *Gammarus fluviatilis* and *Gammarus pulex* he thinks the eyes are pretty much alike in shape. In both the cornea is smooth and without facets. The crystal cone, he says, consists of four pieces, which can scarcely be correct; see Note on Grenacher, 1879. In view of the very varying statements of authors on the eye of *Gammarus puteanus*, he made investigations from which he determines that the optic ganglion is present, but not the eye, though pigment-spots mimicking the eye have led some observers to believe that an eye existed in fact.

Under the heading, "Ueber die Schalendrüse," Leydig reminds us that in his Naturgesch. d. Daphniden, 1860, pp. 28, 29, he had described his discovery in *Gammarus* of the homologue of the "green gland" in *Astacus*, but when he says that O. Sars seven years later only knew of the presence on the lower antennæ of "un procès conique dirigé en bas et appelé l'épine olfactoire," he is very much in error as to the state of Sars' knowledge. See Note on Sars, 1867. Claus, in 1879, objects that the name "Schalendrüse" has no sense when applied as by Leydig to the gland in the base of the antennæ, "sondern passt lediglich für das *in die Schale* gerückte Drüsenpaar der Phyllopoden, welches der *Kieferregion* gehört." The pair of glands corresponding to the shell gland is entirely wanting, he adds, in all developed Malacostraca, and has hitherto been made out only during the larval life in *Sergestes* and *Euphausia*, while on the other hand in the *Phyllopoda* and many other Entomostraca the antennary gland corresponding to the green gland of *Astacus* only exists in the larval stage, but afterwards becomes completely degraded (Der Org. d. Phron., p. 13).

On the digestive system, Leydig recalls the investigations he had described in 1855 in regard to the stomach, histological structure of the intestine, liver and adipose body. He here remarks that the fat-drops are always colourless, and that in the fatty body of the body cavity, round the intestine, there are besides the fat-drops also layers of those concretions

which he had formerly pointed out as existing in *Asellus aquaticus*, and in some insects and Myriapods. On the term Kaumagen here employed for the stomach, Claus says that in the general use by authors of this terminology obviously borrowed from the Decapoda, we must not lose sight of the fact that for the Amphipoda "die Kaufunction des Vormagens bislang keineswegs bewissen worden ist." In fact, he continues, the importance of the supposed Kauplatten (triturating organs) at least in the Phronimidæ appears to be limited to a closing apparatus (as in a lobster-pot), whereby the food that has passed into the Vormagen (cardiac portion of the stomach) is restrained on the one hand from returning into the œsophagus, and on the other from passing over too rapidly into the Magendarm (pyloric portion of the stomach) (Der Org. d. Phron., p. 25).

On the circulation, Leydig calls attention to the presence (observed apparently in *Gammarus puteanus*) of a sharply defined aorta proceeding from the anterior end of the heart, with a furcate division in the head. Also, he says, in the antennæ and pleopoda the arterial course is so definitely distinguished from its surroundings that the expression vessel (Gefäss) is more appropriate for it than lacuna. I do not therefore understand the criticism of Delage (p. 89) upon this paper by Leydig that "cet auteur, au lieu de faire avancer la question, reproduit, au contraire, une erreur ancienne en niant absolument que les courants sanguins des membres possèdent des parois."

Remarks are made by Leydig on the distribution of, and distinctions between, *Gammarus pulex*, de Geer, *Gammarus fluviatilis*, Rösel, and *Gammarus* (*Niphargus*) *puteanus*, Koch. Adopting the view of de Rougemont that *Gammarus pulex minutus*, Gervais, is identical with Koch's *puteanus*, he says that this last was made known by Koch and Gervais at the same time. "Wenn man freilich, wie es hin und wieder geschieht, zu Koch citirt: 'Faunæ insectorum Germaniæ initia, 1798,' so käme die Beobachtung von Koch weit vor jener Gervais'; allein das erste Heft des Koch'schen Werkes, welches als Fortsetzung der von Panzer begonnenen und bis zum 109. Hefte fortgeführten Fauna insectorum Germaniæ auftritt, erschien 1835, nachdem zuvor Herrich-Schäffer die Hefte bis zum 132. herausgegeben hatte. Dieselbe Jahrezahl, 1835, trägt auch der Band der Annales des sciences, welcher die Beobachtungen von Gervais bringt."

Leydig in this work gives a summary of his earlier investigations on the structure of *Gammarus*, which may be quoted in his own words, "So habe ich die histologische Beschaffenheit der Haut schon im Jahre 1855 erörtert und später im Jahre 1860, da ich früher die Cuticula als 'nicht verkalkt' bezeichnet hatte, aufmerksam gemacht, dass doch auch bei *Gammarus* nach Essigsäurezusatz die Haut Luftbläschen entwickle. Ferner wurde, was unten noch einmal zur Sprache kommen soll, die Schalendrüse nachgewiesen, auf die Anwesenheit eines Kaumagens hingedeutet, und die histologische Beschaffenheit des Darmes, der Leber und des Fettkörpers dargethan. Endlich habe ich bereits im Jahre 1848, also um 20 Jahre vor E. van Beneden's Arbeit über die Furchung der Amphipoden, den Furchungsprocess von *Gammarus* beschrieben und abgebildet."

1878. Martens, Eduard von.

Crustacea. The Zoological Record for 1876; being Volume thirteenth of the Record of Zoological Literature. London, M.DCCC.LXXVIII. pp. 1–18.

An analysis is given of Claus' "Untersuchungen zur Erforschung der genealogischen Grundlage des Crustaceen-Systems. Wien, 1876." "*Nebalia* and *Branchipus* among the living forms may give an approximate idea of those primordial forms, from which the Decapods, Stomapods, Amphipods and Isopods are to be derived."

1878. Mayer, Paul, born July 20, 1848 (p.m.).

Carcinologische Mittheilungen. Mit einer Tafel und 4 Holzschn. Mittheilungen aus der Zoolog. Station zu Neapel. 1. Bd. 1. Heft. pp. 40. Taf. 1.

The first chapter is "über die Drüsen in den Beinen der Phronimiden," the second discusses "die Gehäuse der Phronimiden" (Gerstaecker).

This paper, according to Haller, explains in great detail the gland in the grasping-hand of *Phronima sedentaria*, pointing out its position, form, number of outlets, microscopic constitution, and suggesting that it is either a poison-gland, or more probably emits a secretion necessary for dissolving the interior of the creature used by the *Phronima* as a nest or nursery.

1878. Miers, E. J.

Narrative of a Voyage to the North Polar Sea, by Captain Nares. 8vo. 2 vols. 1878. Appendix (No. VII.). pp. 240–248. Crustacea.

The account of the Crustacea appeared in the Annals and Magazine of Natural History in 1877. See Note on Miers, 1877.

1878. Schmidt, Oscar.

Die Form der Krystallkegel im Arthropodenauge. Zeitschft. f. wiss. Zool. Vol. XXX. Suppl. pp. 1–12. Plate 1. Leipzig. 1878.

This paper raises certain objections to the views of Exner and Grenacher on "mosaic vision," which are met by Grenacher in an appendix (pp. 168–170) to his great work on the subject, Untersuch. über das Sehorgan, 1879.

1878. Stebbing, T. R. R.

Notes on Sessile-eyed Crustaceans, with Description of a new species. The Annals and Magazine of Natural History. January 1878. Ser. 5. Vol. 1. London, 1878. pp. 31–37. Pl. 5.

Caprella fretensis, n. sp., is described and figured, from two specimens found at Salcombe in South Devon, at which place the estuary yields *Proto ventricosa*, O. F. M., and many other Amphipods. Meyer accepts *Caprella fretensis* as a distinct species, but considers it extremely close to *Caprella septentrionalis*, Krøyer. It is abundant at Ilfracombe, and very variable, some specimens coming far nearer than others to the published accounts of Krøyer's species just mentioned.

The correlation between the spines on the palms of the hind legs, *die Einschlagdorne*, in the Caprellidæ, and the generic divisions of that family, is noticed. Mayer, die Caprelliden, p. 13, remarks that it would be difficult to carry through the employment of this character for generic division, since *Caprella acanthifera*, for example, would then have to be transferred to another genus. This indeed is on other grounds suggested by Boeck, who thinks that *Caprella acanthifera* may belong to his genus *Æginella*. Of *Stimpsonia*

chelifera, Sp. Bate, the male is figured and both sexes are described. The female is said to bear a close resemblance to that of *Aora gracilis* and that of *Microdeutopus anomalus*.

Of the genus *Callimerus*, Stebbing, the following characters are given:—

"Antennæ subequal; superior antennæ without secondary appendage; first pair of gnathopods simple; second pair having the carpus infero-anteriorly produced, the coxæ of the second pair covering those of the first. Penultimate pleopoda shorter than either of the other pairs. Telson simple." This genus is a synonym of *Amphilochus*, Sp. Bate, the maxillipeds having given rise to the description of the first gnathopods as simple.

1878. Stebbing, T. R. R.

On two new species of Amphipodous Crustaceans. The Annals and Magazine of Natural History. November 1878. Ser. 5. Vol. 2. London, 1878. pp. 364–370. Pl. 15.

"*Amphilochus Sabrinæ*," n. sp., is figured and described. It is very like *Amphilochus bispinosus*, Boeck, but the second side-plate is not serrate as in Boeck's species, having only a single indentation. The two first segments of the pleon have not a dorsal tooth, and in the last uropods the rami are very much shorter than the peduncle, instead of being only slightly so. There are other minute differences, but not such as I should venture to rely on without an examination of fresh specimens. I am aware also that in creatures whose full size is one-twelfth of an inch, the presence of the dorsal teeth on the pleon may sometimes be overlooked.

This paper contains the remarks on *Amphilochus concinna* and *Callimerus aculigitata*, which have been already referred to.

Under the name *Podoceropsis intermedia*, a species is described as new, which is no doubt a synonym of "*Podoceropsis Sophiæ*," Boeck, 1860.

An additional note mentions various "Amphipoda in Sponges."

1878. Streets, Thomas H.

Pelagic Amphipoda. Proceedings of the Academy of Natural Sciences of Philadelphia. 1878. pp. 276–290. Pl. 11.

The collection described was made by Surgeon William H. Jones, U. S. Navy, according to whose experience night is "about the only time when surface dredging can be carried on with any prospect of success." Dr. Streets gives a definition of the Oxycephalidæ, and in a note observes, "Claus classifies the *Oxycephalidæ* along with the *Phronimidæ* in his family *Phronimides*, and states that the mandibular palpus is absent, which is an error. Though absent in both sexes of the *Phronimidæ*, it is present in the male of the *Oxycephalidæ*." (On these points see Notes on Claus, 1879.) Descriptions and (small, inadequate) figures are given of *Oxycephalus tuberculatus*, Sp. Bate, which Claus identifies with *Oxycephalus piscator*, M.-Edw.; of *Oxycephalus bulbosus*, n. s., taken between Lat. 28°00 and 35°45 N., Long. 140°00 and 144°25 W., and given doubtfully by Claus in 1877 as a synonym of his own *Oxycephalus typhoides*, 1879, from Zanzibar and Messina; of *Oxycephalus sclerotica*, n. s., which shares with Claus' *Oxycephalus typhoides* the peculiarity of having "on the fifth epimeral a prominent spine, directed backwards"; and of *Leptocotis spinifera*, Streets, 1877. The new genus *Calamorhynchus* is thus defined:—"Body elongated, slender, almost rod-like. Head large, depressed, produced anteriorly to the eyes in a broadly-

expanded, triangular rostrum; constricted behind the eyes into a short, narrow neck. Superior antennæ with the peduncle three-jointed; in the female straight. First and second pairs of thoracic legs small, chelate, the fourth joint broad and long, the fifth short and narrow. The last three pairs of legs with the basal joint narrowly dilated; the seventh pair diminutive. The sixth segment of the abdomen long and narrow. Caudal appendages long and linear. Telson short, triangular." The type species, *Calamorhynchus pellucidus*, n. s., is described from a female specimen, the head and second thoracic foot being figured. *Rhabdosoma whitei*, Sp. Bate, and "Rhabdosoma armatum (Edw.), Adams and White," are figured and described, two species which Claus unites as identical. *Rhabdosoma armatum*, Sp. Bate, is curiously treated by Dr. Streets as a separate species, to which he gives "provisionally the name *Rhabdosoma longirostris* (Bate)," although he recognises that Spence Bate took his description and figure from the same specimen that furnished White's figure.

1878. UHLER.

Chesapeake Zoological Laboratory. 1878. p. 26.

Two Amphipoda (*Gammarus* sp.? and *Caprella geometrica*, Say), along with other Crustacea, observed at Fort Wool.

1878. WOODWARD, HENRY.

Crustacea. The Encyclopædia Britannica. Ninth Edition. Vol. VI. 1878. pp. 632–666.

1878. ZADDACH, G.

Die Meeres-Fauna an der preussischen Küste beschrieben von Professor G. Zaddach. Erste Abtheilung. Königsberg, 1878. 31 pages.

Zaddach here expresses the opinion that the epimera or side-plates of the Amphipoda are parts of the segments, an inheritance from the unarticulated pleura of the Trilobites, and a higher development of these. For the first joint of the leg after the epimera he adopts the term Hüfte, for the second and third Drehgelenk and Schenkel, for the fourth and fifth Schienenglieder, and for the sixth Tarsus. He gives a table to show the differences between the eight species which he has to describe, namely, *Talitrus locusta*, *Gammarus locusta*, *Melita palmata*, *Calliope læviuscula*, *Protomedeia pilosa*, *Pontoporeia femorata*, *Bathyporeia pilosa*, *Corophium longicorne*. In 1843, he says, specimens of *Corophium longicorne* and *Protomedeia pilosa* were taken by Rathke in lake Geserich. Zaddach himself had not been able since to find them in that, or hear of them in any other, inland water of Prussia.

In describing the family Orchestidæ, he calls attention to the "endophragmal arch," which is wanting in other Amphipoda, with a reference to Bate and Westwood, i. p. xvii, fig. 3; he says that the maxillipeds bear not two, as in the Gammaridæ, but three laminar processes on the three lowest joints, and that they are only five-jointed, because the claw-shaped terminal joint is wanting; the telson, he says, is wanting. But the telson, though small in *Talitrus*, is not wanting in this or any other known genus of the Orchestidæ, and the fourth joint of the maxilliped-palp, though rudimentary or obsolete in *Talitrus* and *Orchestia*, is developed in *Hyale* and *Hyalella*; while, lastly, it is not correct to give as a family

characteristic that the three lowest joints of the maxillipeds are expanded, since alike in *Talitrus*, *Orchestia* and *Talorchestia* it is not the first but the second joint of the palp that has an expansion, nor is that one of such a laminar form as to be properly comparable with the plates attached to the two joints below the palp. The remark that the palp is wanting to the first maxillæ also requires qualification, since in *Talitrus locusta*, for example, one is present though rudimentary in size.

In describing *Talitrus locusta* (Taf. I) Zaddach affirms that there is no trace of a mandibular palp; he says that the function of the mandibular spine-row is obviously to pass on the morsels bitten off by the cutting-edge to the molar tubercle. What is commonly called the under lip should, he thinks, be called the tongue, both from its function and from its answering morphologically to the tongue of many insects. He considers that Linnæus in the description of his *Cancer locusta* in the Fauna suecica could not have intended any other species of Amphipod than this.

In describing the family Gammaridæ, Zaddach maintains that the peduncle of the lower antennæ has but four joints, not admitting the composite character of what he calls the first joint. In the description of *Gammarus locusta* (Taf. 2) he points out that young specimens (Taf. 3) differ from the adults in the size and shape of the eyes, in the number of the joints of the antennary flagella, in the rami of the third uropods, and in the telson. He argues that Linnæus in the Fauna suecica, No. 2041 and No. 2042, by *Cancer pulex*, which gnaws the fishing-nets, meant only *Gammarus locusta*, and by *Cancer locusta* meant only *Talitrus locusta*, since that alone by its leaping, its powerful head and long antennæ, was fit for comparison with a grasshopper or locust. At the same time he considers the name *Gammarus locusta* too firmly established for alteration. He here recognises that the Amphipod in amber, *Palæogammarus sambiensis*, which he described in 1864, may belong to the genus *Gammarus*, or come very near it.

In describing *Melita palmata* (Mont.) Leach, (Taf. 4), Zaddach mentions that the side-plate of the sixth peræon-segment in the female, and not as Boeck states in the male, is prolonged downwards at the front angle and bent upwards into a blunt hook, destined, he thinks, to provide the large claw of the male with a holdfast. (Bruzelius had already, in 1859, rightly ascribed the peculiarity in these side-plates to the female.) *Amphitoe norvegica*, Rathke, he does not consider distinct from *Calliope læviuscula* (Krøyer) Bate, which he figures (Taf. 5) and describes.

It may be noticed that in this paper Zaddach accepts the name *Protomedeia pilosa* for the species which he himself in 1844 named *Leptocheirus pilosus*, but Boeck maintains that *Leptocheirus*, Zaddach, is a genus quite distinct from *Protomedeia*, Krøyer.

1879. Brandt, A.

Von den armenischen Alpenseen. Zoologischer Anzeiger. II. Jahrgang. 1879. p. 525.

In a letter to the editor, dated from Dorf Elenowka am Goktschai, den 26. Juli 1879, Dr. Alexander Brandt reports that in the Goktschai there were swarms of Gammarids, especially on the shore. Those discovered were very uniform, corresponding in size and habit to *Gammarus pulex*. Individuals brought up from a depth of 34 fathoms showed a brighter colouring than those from the upper waters. He remarks that their eyes are not dark or continuously pigmented, but offer only lighter pigment-flakes of a roundish stellate form, so that at first sight he could fancy them destitute of eyes. Have we, he asks, by any chance here to do with a blind variety in statu nascenti?

1879. Claus, C.

Der Organismus der Phronimiden. Mit. 8 Tafeln. Wien, 1879.

Following Milne-Edwards, Claus here sets the Typhidæ or Platyscelidæ (Hyperines anormales), distinguished by a marked sexual dimorphism as well as by the zig-zag antennæ of the male, over against the Hyperina with normal antennæ. In the latter group he arranges, in three families, the Phronimidæ, Hyperidæ and Vibilidæ. The Vibilidæ are easily distinguished by the general form resembling the Gammaridæ, the small size of the head and eyes, as well by the short dilated anterior antennæ. The border line is less easily marked out between the other two families. He characterises them as follows:—

"Hyperidæ. Head of considerable size, more or less globular, with large pair of eyes, extending over almost the whole surface of the head. The antennæ in both sexes with multiarticulate peduncle, in the female without or with rudimentary, in the male with long multiarticulate, flagellum. Gnathopods frequently armed with weak clasper (Greifhand); the rest of the thoracal-limbs end with simple claw and are formed like one another (*Hyperia*), those of the fifth (*Themisto*), and sixth pair (*Cyllopus*, *Cystosoma*) are sometimes considerably elongated, those of the seventh or last pair only as an exception (*Cyllopus*) rudimentary.

"Phronimidæ. Head of considerable size, generally with strongly prominent snout, and divided pair of eyes extending over almost the whole surface of the head. The anterior antennæ with multiarticulate peduncle, in the female short and without flagellum, in the male long with multiarticulate flagellum. The antennæ of the second pair in the male like those of the Hyperidæ, in the female reduced to the coxal-joint coalescent with the cephalic integument and accompanied by the antennary gland. The thoracal legs partially (principally the fifth pair) armed with powerful chelæ (Greifzange), often of different form and size. Elongate backward directed liver-tubes absent from the stomach (am Magendarm fehlen)."

The Phorcinæ, Claus here says, are to be referred to the Typhidæ. The Phronimidæ he subdivides into two subfamilies thus:—

"1. *Phrosininæ*. Form of body broad and compact. The three pairs of uropods broad-leaved with fin-like rami. Besides the powerfully developed fifth pair of legs of the peræon (*Primno* Guér.), generally also the third and fourth pairs (*Anchylomera* Edw. = *Hieracomyx* Guér.), as well as the sixth (*Phrosina* Risso = *Dactylocera* Latr.) armed with powerful claspers (Greifhand).

"2. *Phroniminæ*. Body slender and extended, with the last segment of the peræon elongate. The three pairs of uropods elongate stiliform, with narrow lanceolate rami. Thoracal legs extremely varied, those of the fifth pair [third peræopods] often armed with broad or more elongate (compound) chelæ."

The genus *Phronima*, Latr., is thus defined:—

"Körper gestreckt mit stark verjüngtem und langgezogenem Endsegment der Brust, mit drei Paar wohlentwickelter stilförmiger Uropoden. Kopf kurz, aber hoch mit sehr verlängerter Scheitelmundachse. Vorderantennen des Weibchens zweigliedrig. Basalglied des hintern Antennenpaares im weiblichen Geschlecht kuglig gewölbt und mit kurzer Borste besetzt. Die Mandibeltaster fehlen auch dem Männchen. Unterlippe (Maxillarfusspaar) stark comprimirt, mit lanzetförmig zugespitzten Laden und conischer Zunge. Die beiden Gnathopodenpaare schmächtig, mit schwacher zusammengesetzter Greifhand, fünftes Beinpaar mit mächtiger (zusammengesetzter) Scheerenhand bewaffnet. Drei Paare von Kiemenschläuchen am 4., 5. u. 6. Thoracal segment."

Phronimella, Cls., is thus defined:—

"Körper sehr gestreckt, überaus pellucid, mit nur 2 Paar stilförmiger Uropoden. Kopf kurz,

mit hohem, gewölbtem Scheitel, Scheitelmundachse sehr verlangert. Die zwei vordern Brustsegmente ohne Grenzen verschmolzen. Mandibeltaster fehlen auch dem Männchen. Zunge der Unterlippe (Maxillarfusspaar) auf einen warzenförmigen Höcker reducirt. Die beiden Gnathopodenpaare schmächtig mit schwacher (zusammengesetzter) Greifhand. Das dritte Beinpaar etwas weniger, das vierte stark verlängert. Das fünfte Beinpaar endet mit sehr langgestreckter (zusammengesetzter) Greifhand. Drei paare von Kiemenschläuchen am 4., 5. und 6. Brustringe." *Phronimella elongata* is the type species, with which Dr. Streets has identified his own *Anchylonyx hamatus*. In fact, as Streets has already observed, there are in the male three pairs of uropods, and I find that a rudiment of the middle pair is, at any rate sometimes, persistent in the adult female. The first peræopod (das dritte Beinpaar) is longer than the second, not vice versa. The error in the generic definition was made by Claus in his original account of "*Phronima elongata*," but corrected by Claus himself in the same year, 1862.

Phronimopsis, n. g. (figs. 1–3), is thus defined :—

"Körper zoëa ähnlich, mit gedrungenem, fast kuglichem Vorderleib, schmalem, langgestrecktem Abdomen und 3 Paar langer stilförmiger Uropoden. Kopf kurz und hoch. Die beiden vordern Brustsegmente ohne Grenzen verschmolzen. Vorderantennen des Weibchens zweigliedrig, relativ lang, hintere Antennen mit Stachel. Das Männchen mit dreigliedrigem Mandibeltaster. Zweites Gnathopodenpaar dick und stark, mit vollkommener Scheere bewaffnet. Die fünf nachfolgenden Beinpaare des Thorax dünn und langgestreckt, sämmtlich mit schwacher langgezogener Greifhand endigend. Die Uropodenäste schmal und griffelförmig, fast so lang als das stilförmig gestreckte Basalglied."

Phronimopsis spinifer, n. s., is the type species, for which the numerous red-brown stellate pigment-spots on the sides of the peræon, the spine-processes on the antennæ and upper lip, and the angular curvature of the femoral-joint of both gnathopods, are given as distinguishing characters.

Paraphronima, n. g. (figs. 4–10), is thus defined :—

"Körper ziemlich stark comprimirt, mässig gestreckt, mit nur schwach verjüngtem, wenig verlängertem Endsegment der Brust, mit 3 Paar stilförmiger Uropoden. Kopf sehr umfangreich, in Seitensicht fast quadratisch, mit gewölbtem Scheitel. Vorderantennen des Weibchens viergliedrig, mit kurzen Zwischengliedern. Hinterantenne des Weibchens rudimentär, griffelförmig. Mandibeltaster fehlen auch dem Männchen. Laden der Unterlippe (Maxillarfusspaar) breit, lamellös. Das vordere Gnathopodenpaar endet mit schwach ausgeprägter (doppelt zusammengesetzter) Greifhand und bleibt ebenso wie das zweite Gnathopodenpaar kurz. Die nachfolgenden Beine gestreckt und wie bei Hyperia unter einander gleich gebildet. Vier Paare von Kiemenschlauchen am 3. bis 6. Brustringe." *Paraphronima gracilis*, ♀, n. s. (fig. 4), and *Paraphronima crassipes*, n. s. (fig. 4. and fig. 10), are the two species assigned to this genus.

From page 8 to page 78 the investigation is conducted which is indicated in the title of the paper. The principal results are thus summarised by the author himself :—

1. The two new genera *Phronimopsis* and *Phronimella* prove that the armature of the fifth pair of legs [third peræopods] with a chelate hand (Scheerenhand) is a character only of generic value.
2. The females of the Phronimidæ possess a rudiment of the second pair of antennæ, which is generally reduced to the spherically protuberant coxal-joint containing the coiled antennary gland.
3. In front of the mouth lies a rudiment of the upper lip, an atrium bounded by the side-plates of the mandibles and the lower lip (Paragnathen), into which cavity flows the secretion of powerful glands when food is being taken.
4. These glands are complexes of four gland-cells with long emission-ducts, and lie partly in

the periphery of the œsophagus, partly in the maxillæ, in which in point of form and structure they repeat the leg-glands.

5. The function of these glands is the preparation of the ferment (Enzyme), which is mixed with the food at its entrance into the œsophagus, to facilitate the digestion of starch and albuminoid substances.

6. The alimentary canal (Darmcanal) is devoid of every form of gland-cells. To the muscular œsophagus of complicated structure, lined with chitinous *Intima*, succeeds the œsophageal stomach (Schlundmagen, Vormagen), with two cæca (Nebentaschen), stretching into the crop (Magendarm). In this digestion is carried out. The crop which surrounds it, situate in the head and the two first peræon-segments is, like its two forward-directed pairs of so-called liver tubes, lined with a deep cylindrical epithelium, which repeats the structure of the epithelium of the mid-gut (Dünndarm-epithel), and serves for resorption. The narrow intestinal tube (Darmrohr), is lined with a polygonal pavement epithelium, and in the sixth pleon-segment passes over into the short rectum (Afterdarm), which is fastened to the integument by means of dilators. [At page 23, in the *Munddarm* of *Phronima* three sections are distinguished as *Mundhöhle*, *Schlundkopf* and *Schlundrohr* or œsophagus.]

7. The annular muscles of the intestinal tube correspond to single muscle-cells, the nuclei of which follow one another in a median row on the dorsal side of the intestine.

8. The heart stretches from the boundary of the head to the middle of the sixth peræon-segment, and possesses, besides the three pairs of ostia provided with valves and the two aortas, two pairs of lateral arteries.

9. Each artery arises over an oblong slit bounded by two side-flaps (Seitenklappen) while at the base of each aorta lie two obliquely set ostia with a pair of flaps (valve-opening) to each.

10. The obliquely transverse muscle-rings of the heart are developed from two lateral rows of cells, between which a dorsal and ventral median-suture remains.

11. Under the heart, adjoining the ventral wall of the heart, there stretches across through the body-cavity a septum composed of large cell-plates. Besides this there is a second septum which occupies a similar position in regard to the intestine, so that the space of the body is divided into three blood-channels bounded by connective-tissue, and communicating with one another by definite openings. Besides these main channels, which are continued on into the head, there exist a number of more peripheral accessory channels, likewise bounded by connective-tissue, which represent the blood-courses of the regular circulation.

12. The ventral ganglionic chain contains, excluding the subœsophageal ganglion-mass, nine ganglia, of which five belong to the peræon, four to the pleon. The last peræon- (thoracal) ganglion, just as the last pleon- (abdominal) ganglion, follows the next preceding ganglion immediately. The last pleon-ganglion has arisen out of the concretion of three ganglia for the fourth, fifth and sixth pleon-segments, these ganglia in the embryo being separate.

13. The subœsophageal ganglion-mass corresponds to six ganglionic nuclei, or to seven if we take into account the ganglionic centre belonging to the commissures which provides for the nerves of the second antennæ. Besides the nerves of the second antennæ also all the maxillary nerves are derived from the œsophageal commissure, to which their place of origin has shifted itself.

14. The peripheral nerves are rooted, not in the so called "Punktsubstanz" [Dietl's *Mark-substanz*, p. 57, *myeloid substance*, Packard], but derive their fibres from ganglion-cells partly of the corresponding ganglion—as well crossed as uncrossed fibres—partly of the preceding ganglion, partly from the brain.

15. The fibre-tracts of the so-called œsophageal commissure which enter the brain pass partly to the ganglion-layers of the same half of the brain, partly in crossed course to those of the

opposite side. In the brain there exists a powerful commissural system, from which portions reach laterally into the powerful optic-ganglia.

16. The ganglion-cell-layers are thickenings of the superficial layer. Inner ganglionic nuclei do not exist. The small-celled ganglion formation of the cap-shaped hinder lobe answers to the fungus-like structure on the brain of the higher Crustacea and insects.
17. The optic-fibres of the lateral eye and of the frontal eye run in planes that cross at nearly a right angle.
18. Each eye is surrounded by a firm sheath, the continuation of the outer nerve-sheath of the brain, which also wraps itself over the front surface, and before each complex of two crystal cone-cells between the rounded vesicles of their nuclei contains two flat oval nuclei.
19. The enticular cornea is not derived from the crystal cone-cells, but from a special hypodermis-layer separated from those cells by the eye-sheath, and is renewed at the time of exuviation.
20. The eye continuously increases in extent with the growth of the body, by the formation of new peripheral elements.
21. The objection to the possibility of mosaic vision based on the form of the crystal cone is thoroughly untenable. [At p. 72, Claus expresses his agreement with Grenacher's opinion, that the Hyperidæ are not dim-sighted.]
22. At the ovary there is a special germinal layer. The geniculate terminal section of the oviduct ends with a sack-like expansion in a seminal pocket.

Of parasites, Claus found in the crop of *Phronima* and *Phronimella* almost constantly a little oval Gregarine, free or encysted; more rarely, in the body-cavity of *Phronima*, embryos of *Echinorhynchi*, and sometimes in the brain a young Nematode, spirally rolled.

To judge by the short list of literature on page 81, Claus was unacquainted with the papers on the pelagic Amphipoda by Dr. T. H. Streets, which are dated 1877 and 1878.

1879. Claus, C.

Die Gattungen und Arten der Platysceliden in systematischer Übersicht. Wien, 1879. (Separat-Abdruck aus den Arbeiten des Zoolog. Instituts zu Wien, Tom. II., Heft 2.)

This work, which has been since its publication the leading authority on the group with which it deals, is practically embodied, though with a few modifications, in the larger and finely illustrated work by the same author published this year (1887).

It is noticed that in external form the Platyscelidæ show an astonishing number of gradations from the egg-like Typhidæ to the rod-like Oxycephalidæ. The common features are to be found in the structure of the antennæ in the male and of the fifth and sixth thoracal legs (third and fourth peræopods) in both sexes. Five families are established, in two divisions, division A. containing the Typhidæ and Scelidæ, division B. the Pronoidæ, Lycæidæ and Oxycephalidæ. In 1887 the Lycæidæ form a separate division.

The Typhidæ contain five genera:—1. *Eutyphis*, taking the place of *Typhis*, Risso, preoccupied, and having in the synonymy "(*Thyropus*, Dana, Sp. Bate ♂ = *Dithyrus* Dana ♀, *Platyscelus* Sp. Bate ♀)," of which names *Dithyrus*, Dana, must take precedence of *Eutyphis*. In this genus both pairs of gnathopods have compound chelæ, the two end-joints of the hinder antennæ in the male are very much shorter than the two preceding joints, and the lobes of the maxillipeds (Unterlippe) are slightly concave on the inner edge. The species assigned to it are—1. *ovoides*, Risso (including *Platyscelus serratus*, Sp. Bate (♀), and *Thyropus ovoides*, Sp. Bate (♂)); 2. *armatus*, n. s.; 3. *serratus*, n. s.; 4. *globosus*, n. s. In 1887 Claus adds "*E. inermis* Cls. (Dithyrus Faba Dana?)."

2. *Hemityphis*, n. g., thus defined :—

"Körpergestalt und ebenso die Bewaffnung der Gnathopoden wie bei *Eutyphis*. Die beiden Endglieder der hinteren Antennen des Männchens sehr lang, nur wenig kürzer als die beiden vorausgehenden Glieder. Die Seitenladen der Unterlippe durch eine tiefe Ausbuchtung getrennt. Subterminaler Zahn der linken Mandibel sehr gross und gezähnelt. Drüse im Schenkel der Gnathopoden und in der Tibia des dritten und vierten Beinpaares. Femoralplatte des sechsten Beinpaares mit kleiner, kurzer Grube oberhalb der Firste des Unterrandes." ("Die Oberlippe bildet eine helmförmig gewölbte Klappe mit zwei seitlich vorragenden Flügeln," 1887.) *Hemityphis tenuimanus*, n. s., and *Hemityphis crustulum* (*crustulatus*, 1887), n. s., are described.

3. *Paratyphis*, n. g., thus defined :—

"Körpergestalt ganz ähnlich wie bei *Hemityphis*. Die beiden Endglieder der hinteren Antenne des Männchens lang. *Die vordern Gnathopoden ohne, die des zweiten Paares mit kurzem und schwachem Scheerenfortsatz des Carpus.* Drüse im Schenkel der Paragnathen [lower lip, for which in 1887 Gnathopoden is substituted] und im proximalen Abschnitt von Tibia und Carpus des dritten und vierten Beinpaares. Femoralplatte des fünften Beinpaares schlank und gestreckt. Femoralplatte des sechsten Beinpaares mit grosser taschenförmiger Grube oberhalb der (linearen, 1887) Firste des Unterrandes." ("Abdomen relativ umfangreich. Das Basalgleid der hinteren männlichen Antenne etwa halb so lang als die nachfolgenden Glieder. Femoralglied des siebenten Beinpaares mässig breit, blattförmig, gekrümmt, mit rudimentärem ungegliederten Anhang. Die Epimeren sämmtlicher segmente stark vorspringend, die des fünften Beinpaares mit Zahnfortsatz. Uropodenäste lanzetförmig. Aussenast des letzten Paares sehr klein. Telson gross," 1887.) The type is *Paratyphis maculatus*, n. s. *Paratyphis parcus*, n. s., is added in 1887.

4. *Tetrathyrus*, n. g., thus defined :—

"Kopf breit und kurz mit dreieckiger Stirn. Körpergestalt wie bei *Eutyphis*. Die beiden Endglieder der hintern männlichen Antenne mit den vorausgehenden nahezu gleich lang. Oberlippe helmförmig erhoben und seitlich umgebogen. Seitenblätter der kahnförmig gekrümmten Unterlippe über die Zunge und Oberlippe hinausragend. Mandibel relativ kurz und geradgestreckt. *Die beiden Gnathopodenpaare enden mit kleiner einfacher Zange.* Drüse im proximalen Theil der Tibia des dritten und vierten Beinpaares. Femoralplatte des sechsten Beinpaares mässig lang und hoch, ohne spaltförmige Grube der Aussenfläche. Siebentes Bein auf die langgestreckte Femoralplatte reducirt." Type *Tetrathyrus forcipatus*, n. s.

5. *Amphithyrus*, n. g., thus defined :—

"Körpergestalt ähnlich wie bei *Eutyphis*. Mundwerkzeuge kegelförmig vorgestreckt. Mandibeln kurz und gedrungen. Die beiden Endglieder der hinteren männlichen Antennen mit den vorausgehenden nahezu gleich lang. *Beide Gnathopodenpaare enden mit zusammengesetzter Zange.* Drüsen im proximalen Abschnitt von Femur und Tibia des dritten und vierten Beinpaares. Femoralplatte des fünften Beinpaares gestreckt eiförmig, die des sechsten Beinpaares relativ kurz und hoch, mit hoher taschenförmiger Grube an der Aussenfläche. Stiel des ersten und zweiten Uropodenpaares gestreckt." ("Unterlippe zu einer kurzen Saugröhre umgestaltet," 1887.) The species described are *Amphithyrus bispinosus*, n. s.; *Amphithyrus sculpturatus*, n. s.; *Amphithyrus similis*, n. s.

The remaining genera must be described in the less detailed form, which is given in advance of the fuller definitions.

The second family, Scelidæ, contains :—

1. *Euscelus*, n. g., in which "Beide Gnathopodenpaare enden mit zusammengesetzter Scheere. Femoralplatte des sechsten Beinpaares ohne Spalte." Type, *Euscelus robustus*, n. s.

2. *Schizoscelus*, n. g., in which "Das vordere Gnathopodenpaar endet klauenförmig, das

hintere mit zusammengesetzter Scheere. Femoralplatte des sechsten Beinpaares mit langer sichelförmig gebogener Längsspalte." Type, *Schizoscelus ornatus*, n. s.

3. *Tanyscelus*, n. g., in which "Beide Gnathopodenpaare enden klauenförmig. Femoralplatte des sechsten Beinpaares sehr lang gezogen und vorn verschmälert mit taschenförmiger Grube der Aussenfläche. Endglied der hinteren männlichen Antenne kurz. Uropodenäste flossenförmig verbreitert." Type, "*Tanyscelus sphæroma*, n. sp. (*Thyropus diaphanus* Dana?)."
4. *Parascelus*, n. g., in which "Beide Gnathopodenpaare enden klauenförmig. Femoralplatte des sechsten Beinpaares relativ kürzer und ohne Grube an der Aussenfläche. Endglied der hintern männlichen Antenne von mittlerer Länge. Uropodenäste relativ schmäler, fast lanzetförmig." Species, "*Parascelus Edwardsii*," n. s.; *Parascelus typhoides*, n. s.; *Parascelus parrus*, n. s.

The third family, Pronoidæ, contains:—

1. *Pronoë*, Guérin, in which "Beide Gnathopodenpaare enden klauenförmig, vordere Antennen des Männchens mit zweigliedrigem Geisselanhang. Hintere Antennen kurz, nur ein- oder zweimal gefaltet." Type species, *Pronoë capito*, Guérin.
2. *Epronoë* (*Pronoë*, Dana, ex parte), in which "Das hintere Gnathopodenpaar mit zusammengesetzter Scheere, vordere Antennen des Männchens mit dreigliedrigem Geisselanhang. Hintere Antennen lang, zickzackförmig gefaltet, mit sehr kurzem Endglied. Doppelsegment des Abdomens (5 und 6) relativ kurz. Aeste des letzten Uropodenpaares sehr lang, flossenförmig," with the species *Epronoë maculata*, n. s.; *Epronoë armata*, n. s. (*Pronoë brunnea*, Dana, ?); *Epronoë minuta*, n. s. For the opinion that this genus is a synonym of *Orio*, Cocco, see Note on de Natale, 1850; to the small female specimen from Lagos there mentioned, Claus in 1887 gives the name *Epronoë serrata*, n. s.
3. *Parapronoë* (*Amphipronoë*, Spence Bate, ?), which resembles the preceding genus, except that it has "Doppelsegment des Abdomens ungewöhnlich verlängert. Aeste des letzten Uropodenpaares kurz." This has the species *Parapronoë crustulum*, n. s.; *Parapronoë parra*, n. s. Spence Bate assigns to *Amphipronoë*, "first pair of gnathopoda complexly subchelate; second pair not subchelate." On the supposition that the words "first" and "second" in this account ought possibly to be transposed, Claus gives *Amphipronoë* as a doubtful synonym of *Parapronoë*. *Amphipronoë serrulata*, Streets, 1877, has the gnathopods described in accordance with Spence Bate's generic account.

The fourth family, Lycæidæ, contains:—

1. *Thamyris*, Spence Bate (with *Brachyscelus*, Spence Bate, ♀, and *Schnehageuia*, Claus, for synonyms). In this genus "Beide Gnathopodenpaare enden mit zusammengesetzter gezackter Scheere. Stiel des ersten Uropodenpaares kaum länger als die Aeste. Fünftes Beinpaar mit dem sechsten ziemlich gleich lang." It receives the species *Thamyris rapax*, Claus (*Schnehageuia rapax*, Claus, 1871), and *Thamyris globiceps*, n. s. Claus has also examined a female specimen of a much smaller and perhaps distinct form. Independently of this, and another larger specimen of some species of *Thamyris* of unknown locality, Claus describes in 1887 two fresh species, *Thamyris lycæoides*, n. s., and *Thamyris mediterranea*, n. s. Whether Spence Bate's *Thamyris antipodes* and *Thamyris* (*Brachyscelus*) *crusculum* are separate species he cannot determine with certainty; in 1887 he thinks it probable that they are.
2. *Lycæa*, Dana, in which "Beide Gnathopodenpaare enden mit scharfrandiger zusammengesetzter Scheere. Das erste Uropodenpaar stielförmig verlängert, mit kurzen Aesten. Fünftes Beinpaar stark verlängert." Species, *Lycæa nasuta*, n. s.; *Lycæa similis*, n. s.; *Lycæa serrata*, n. s.; *Lycæa robusta*, n. s. (*Lycæa pulex*, Marion (?). Junges ♂). To the description of *Lycæa robusta* in 1887 Claus adds, "Hier schliesst sich die von *Marion* beschriebene *Lycæa pulex* an, von welcher lediglich jugendliche Individuen in der

Athemhöhle von Salpen gefunden wurden," without explaining why he does not in that case adopt Marion's earlier specific name.

3. *Simorhynchus*, Claus, in which "Das vordere Gnathopodenpaar endet einfach klauenformig, das hintere mit halber Scheerenhand. Stiel des ersten Uropodenpaares so lang als die Aeste. Fünftes Beinpaar nur wenig verlängert," with the species *Simorhynchus antennarius*, Claus. In 1887 *Simorhynchus rapax*, Claus, is given as a synonym, with a reference to the Untersuchungen, 1871, but this is probably an accidental confusion with *Schuchagenia rapax*, the synonym of *Thamyris rapax*.

4. *Pseudolycæa*, n. g., in which "Beide Gnathopodenpaare enden einfach klauenformig. Fünftes Beinpaar ungefahr so lang als das sechste. Stiel des ersten Uropodenpaares lang, zwei- bis dreimal so lang als die Aeste. Siebentes Beinpaar mit breiter Femoralplatte, ungewöhnlich gross und vollzählig gegliedert," with type species *Pseudolycæa pachypoda*, n. s.

5. *Paralycæa*, n. g., in which also "Beide Gnathopodenpaare enden einfach klauenförmig," while it has "Fünftes Beinpaar stark verlängert. Stiel des ersten Uropodenpaares so lang als die Aeste. Siebentes Beinpaar mit dünnen, gebogenen Femoralplatten und rudimentärem Anhang." Type species, *Paralycæa gracilis*, n. s.

6. *Lycæopsis*, n. g. "Beide Gnathopodenpaare enden einfach klauenförmig. Sechstes Beinpaar stark verlängert, siebentes Beinpaar dünn und gestreckt, vollzählig gegliedert." Type species, *Lycæopsis themistoides*, n. s.

In 1877 Claus remarks that *Phoreus*, M.-Edw., belongs to the Lycæidæ, while he no longer definitely includes *Lycæopsis* in that family. Among other exceptional characters of that genus, he notes that there are only two pairs of branchial vesicles. These are on the third and fourth peræopods.

The fifth family, Oxycephalidæ, contains:—

1. *Oxycephalus*, Milne-Edwards, in which "Beide Gnathopodenpaare enden mit zusammengesetzter Scheere. Körper mässig gestreckt, Stirnschnabel nicht merklich länger als der Kopf, die Femoralstücke des fünften und sechsten Beinpaares sind ziemlich hohe Platten." The species assigned are *Oxycephalus piscator*, M.-Edw., with *Oxycephalus oceanicus*, Guérin, and *Oxycephalus tuberculatus*, Sp. Bate, as synonyms (to which in 1887 *Oxycephalus tuberculatus*, Streets, 1878, is added); *Oxycephalus similis*, n. s.; *Oxycephalus latirostris*, n. s.; *Oxycephalus tenuirostris*, Claus, 1871 (to which in 1887 *Leptocotis spinifera*, Streets, 1878, is given as a synonym); *Oxycephalus porcellus*, n. s.; *Oxycephalus longiceps*, n. s.; *Oxycephalus typhoides*, n. s. (to which in 1887 *Oxycephalus bulbosus*, Streets! 1878, is assigned as a possible synonym). For the suggestion that *Oxycephalus typhoides* might be the *Ornithoramphus cocoi* of de Natale, see Note on de Natale, 1850. De Natale's species is clearly an *Oxycephalus*, but further than this its identification perhaps cannot be carried.

2. *Rhabdosoma*, White (properly Adams and White), in which "Beide Gnathopodenpaare enden mit zusammengesetzter Scheere. Körper stabförmig verlängert, Stirnschnabel zu einem langen Stachel ausgezogen; ebenso die Uropodenpaare. Die Femoralglieder des fünften und sechsten Beinpaares dünn und gestreckt, denen der vorausgehenden Beine ähnlich." ("Siebentes Bein auf die Femoralplatte reducirt," 1887.) The single species is *Rhabdosoma armatum*, M.-Edw., of which "*Rhabdosoma Whitei*," Spence Bate, is the male.

1879. Edward, Thomas.

Selections from the Fauna of Banffshire, by Thomas Edward, A.L.S., in Life of a Scotch Naturalist, by Samuel Smiles. Sixth Edition. London, 1879. pp. 391–438.

The list of Amphipoda extends from page 432 to page 435. Some notes are given on the colouring of various species, and on the times of the year at which specimens were taken with eggs. The colouring of the eggs of sundry species is also noticed. To *Nænia tuberculosa* the note is appended, "With eggs in December. The female has the palms of the two first pairs much narrower than the male." After the names *Lestrigonus exulans* and "*Kinahani*," *Hyperia galba* and *Hyperia oblivia*, the observation is made, "These are the only species of this family which I have ever found on the Medusæ. I consider Lestrigonus Exulans to be the male of Hyperia Galba, and L. Kinahani the male of H. oblivia." After the names "*Hyperia tauriformis*, n. s.," "*prehensilis*, n. s.," "*cyanea*, n. s.," he writes, "All these three new species were first taken at Banff by T. E.; the males and females of all three being procured. The males differ but little from the females, except that they are somewhat larger." No notice is taken of the name *Hyperia minuta*, which he spoke of in 1868. Of *Dulichia porrecta* and *Dulichia falcata* he says, "I look upon these as being male and female of the same species."

The list, like the rest of Mr. Smiles' entertaining book, is disfigured by numerous misprints. *Phocus* is given for *Phoxus*, *Zetlandica* for *Shetlandica*, *Bedlomensis* for *Vedlomensis*, *Phersua* for *Pherusa*, *grandaculis* for *grandoculis*, *Hora* for *Aora*, *Megamdera* for *Megamoera*, *Siphondecetes* for *Siphonœcetes*, *Protomedia* for *Proto*, the last being perhaps due to a slip of the pen on the author's part.

1879. Fries, S.

Mittheilungen aus dem Gebiete der Dunkelfauna. *Gammarus* (*Niphargus*) *puteanus*, Koch. Zoologischer Anzeiger. II. 1879. pp. 33–38, 56–60, 129–134, 309.

The occurrence of well-shrimps in the slightly brackish wells of Heligoland and in England is discussed, and the view advocated that they must have existed in these localities before the islands were separated from the mainland. Fries has examined specimens from the above mentioned wells of Heligoland, from the Falkenstein caverns, from the springs running out of the caverns, from the Hilgerhäuser caverns, and from the depths of the Lake of Geneva. In all he finds no greater differences than would justify the naming of varieties. He therefore adheres to the view of Rougemont in uniting the various so-called species of the well-shrimp, and considers that the name *Gammarus puteanus*, as the earliest and best known, should be retained, though appearing unduly to restrict the distribution of the species to wells. Humbert's definition of the genus *Niphargus*, he considers, may be applied to the specific definition of *Gammarus puteanus*. The addition, however, to "Oculi nulli" of "vel rudimentarii" must be struck out. In the second maxillæ, which according to Humbert have the setæ of the inner lobe only at the apex, specimens from the Falkenstein spring show three bristles somewhat further down the inner rim than is the case in Humbert's drawing, Pl. VI. Fig. 8*a*. A constant character in all specimens of *Gammarus puteanus* examined by Fries is, that the secondary flagellum of the upper antennæ has only two joints, not four or three as in *Gammarus pulex* ♂ and ♀ respectively.

At pages 129–134 he discusses the Isopod "*Asellus cavaticus*, Schiödte (in litt.) (= *Asellus Sieboldii*,

Rougemont)." He has uniformly found this in company with *Gammarus puteanus*, which, according to Rougemont, is its mortal foe. He agrees with Rougemont in considering that *Asellus caraticus* is related to *Asellus aquaticus* very much as *Gammarus puteanus* is to *Gammarus pulex*.

At p. 309 other localities are mentioned for the occurrence of *Gammarus puteanus* and *Asellus caraticus*.

1879. Grenacher, H.

Untersuchungen über das Sehorgan der Arthropoden, insbesondere der Spinnen, Insecten und Crustaceen. Göttingen. 1879.

Preliminary notices of these investigations were given in the Göttinger Nachrichten, 1874, Nr. 26, and in the Klinischen Monatsblätter für Augenheilkunde, supplementary number for May, 15th year, 1877.

The elaborate and exquisite illustrations to this work seem to show all that is at present known as to the organs with which the book is concerned. Grenacher maintains "the theory of Mosaic Vision," propounded by Johannes Müller in 1826, and gives references to numerous works more or less opposed to or agreeing with his own views. In pages 109–114, and on Plates IX. and X., he treats of the eyes of the Amphipoda, referring especially to *Gammarus locusta*, *Talitrus saltator*, *Gammarus neglectus*, *Hyperia galba*, *Phronima sedentaria*. Fig. 99 gives a "Schnitt, parallel der Langsaxe des Thieres und senkrecht auf die Längsaxe der Gesammtauges, von Gammarus locusta." Fig. 100 shows a single ocellus from the same animal with the "nuclei of Semper" on the surface over the crystalline cone, composed as usual of two longitudinal segments. Fig. 102, A. and B., shows two ocelli of *Talitrus locusta*, one from the middle, the other from the rim of the eye. Fig. 103 shows the "Zellkerne der Retinula" on either side of the inner end of the crystalline cone of one of these ocelli. Fig. 104 shows the "Krystalkegel mit Retinula aus dem Auge von Hyperia galba (H. Latreillei). Der Krystalkegel aus dem peripherischen Theilen des Auges ist von einer weiten Hülle umgeben, deren Kerne vorn gelegen sind. Besondere Zellen, um das Hinterende des Krystalkegels. Das fein quergestreifte Rhabdom hat in seinem Innern einen deutlichen Canal." Fig. 105, a.b., is a "Querschnitte durch den Krystalkegel desselben Thieres in verschiedene Höhen, um das Verhalten desselben zu seiner Hülle zu zeigen." Fig. 106, a.b.c., shows "Querschnitte durch die Retinula desselben Thieres in drei verschiedenen Gegenden. An allen ist die Zusammensetzung der Retinula aus fünf Zellen, an den beiden ersteren auch die des Rhabdoms aus ebensoviel Stäbchen, sowie der centrale Canal desselben zu erkennen."

1879. Hoek, P. P. C.

Carcinologisches, grösstentheils gearbeitet in der zoologischen Station der niederländischen zoologischen Gesellschaft. Tijdschrift der Nederland. Dierkund. Vereeniging. Deel IV. 1879. pp. 97–161. Mit Taf. V.–X.

The work contains five chapters:—

I. On the anatomy and classification of the Caprellidæ.

II. Contributions to the knowledge of the Corophidæ. Dr. Hoek here goes into detail to confirm the opinion of A. M. Norman that "*Corophium Bonellii*," Bate and Westwood, is the female of *Corophium crassicorne*, Bruzelius. He unites, in agreement with Axel Boeck,

Podocerus pulchellus, Leach, and *Podocerus pelagicus* with the earlier *Podocerus falcatus*, Montagu. He describes a new species, "*Orthopalame Terschellingi*," thus defining the new genus *Orthopalame*, "Epimera anteriora quinque magna, quinto in margine posteriore non inciso. Antennæ superiores flagello elongato, flagello accessorio parvo 2-articulato. Antennæ inferiores non subpediformes, superioribus parum breviores, flagello multiarticulato. Mandibulæ robustæ, palpo elongato, 3-articulato, articulo tertio palpi non perdilatato. Pedes 2di paris iisdem primi multo validiores. Pedes saltatorii ultimi paris uniramosi. Appendix caudalis recurvata, hamulo parvo armata," and further remarking that it has affinities in some repects with *Cerapus*, in others with *Amphithoë*. He suggests that the gland in the first joint of the first and second peræopods will be found common to all the Corophidæ, and connected with their mode of life in building nests or lining their excavated passages, a matter on which S. I. Smith in the following year published some interesting observations (Trans. Connect. Acad., vol. iv., July 1880).

III. On an *Orchestia* from terra firma. The *Orchestia* in question was found in a walled garden in the town of Zalt-Bommel in the province of Gelderland, many miles from the sea, and is identified by Dr. Hoek with *Orchestia carinana*, Heller, taken on Olympus in Cyprus at a height of 4000 feet.

IV. On some insufficiently known Gammarids. These are—1. *Atylus swammerdammii*, Milne Edwards; 2. *Calliopius lævisculus*, Kröyer, on which Dr. Hoek observes that the genus *Calliopius* is intermediate between the Atylinæ, to which Boeck assigns it, and the Gammarinæ; 3. *Melita obtusata*, Montagu, as to which he adopts Norman's statement that *Melita proxima*, Bate and Westwood, is the most frequent form of the male of *Melita obtusata*, and *Megamœra alderi*, of those authors, its female; 4. *Cheirocratus brevicornis*, n. s., which, however, is the same as *Cheirocratus sundevalli*, Rathke, and has also been described under the names *Liljeborgia shetlandica*, Sp. Bate, and *Liljeborgia normanni*, Stebbing, though some of its characteristic points were first clearly brought out by Dr. Hoek; 5. *Ampelisca æquicornis*, Bruzelius, is distinguished from *Ampelisca lævigata*, Lilljeborg; *Tetromatus typicus*, Sp. Bate, later incorrectly identified by Sp. Bate with *Ampelisca gaimardi*, Kröyer, and by Norman and Boeck and Hoek considered synonymous with *Ampelisca carinata*, Bruzelius, and by Sars with *Ampelisca tenuicornis*, Lilljeborg, is here attached, in accordance with Norman's suggestion, to *Ampelisca æquicornis*, Bruzelius, as the male form. But Bate's species is distinct, and is entitled to the name *Ampelisca typica*, if a species which is not the type can lawfully be called *typica*: see discussion in Note on Sars, 1882.

V. Short anatomical notes on Gammarids, referring to the structure of the antennæ with their "calceoli," etc., and to the branchiæ of *Atylus swammerdammii*.

1879. Joseph, Gustav.

Zur geographischen Verbreitung von *Niphargus puteanus*, Koch. Zoologischer Anzeiger. II. Jahrg. 1879. pp. 380–381.

In regard to the *Niphargus puteanus* from Venice, it is shown that their introduction into the carefully covered wells (Pozzi) of Venice is best explained by the transport of water from the mainland to replenish these wells in the dry season.

1879. Martens, Eduard von.

Crustacea. The Zoological Record for 1877; being Volume fourteenth of the Record of Zoological Literature. London, M.DCCC.LXXIX. pp. 1–36.

1879. Miers, E. J.

Japanese Crustacea. Proc. Zool. Soc., 1879.

Only an incidental allusion to the Amphipoda is here made.

1879. Miers, E. J.

An account of the petrological, botanical and zoological collections made in Kerguelen's Land and Rodriguez during the transit of Venus expeditions. Philosoph. Transact. of the Royal Society of London. Vol. 168. Crustacea. pp. 200–214, 485–496. Pl. XI. 1879.

The description of *Talitrus gulliveri* from Rodriguez is here repeated. In the account of the Kerguelen Amphipoda, notice is taken of *Hyale villosa*, Smith, *Lysianassa kidderi*, Smith; *Lysianassa kerguelensi*, Miers, is transferred to *Anonyx*, and will be discussed further on in this Report. This species, together with *Atylus australis* and *Podocerus ornatus*, is figured and more fully described than when first published.

1879. Pagenstecher, H. Alex.

Ueber die Thiere der Tiefsee. Sammlung gemeinverständlicher wissenschaftlicher Vorträge, herausgegeben von Rud. Virchow und Fr. von Holtzendorff. XIV. Serie. Heft 315 und 316. Berlin, 1879. 64 pages.

On pages 25 and 26 Pagenstecher describes the course of the Challenger's voyage. On page 39 he gives the following account of Amphipoda found "in grösseren Tiefen." "Sitzängige [Crustacea] treten mit sonderbaren Formen reichlich auf. Unter den *Amphipoden* zeichnet sich durch Grösse mit über 10 cm *Cystosoma Neptuni Guérin Méneville* aus in 1096 F. bei Cap S. Vincent, 1500 bei S. Paul's Felsen, auch an den Aru. Der Kopf dieses ganz durchsichtigen meist in 50 bis 100 F. schwimmenden, wenig Eier führenden Krebses ist fast so gross als die sieben Rumpfsegmente zusammen und wird oben gänzlich von den Augen eingenommen. Dabei haben, was Krebsen äusserst selten und bei Phronima dem Weibe allein zukommt, beide Geschlechter nur ein Fühlerpaar. Den *Gammarus loricatus* des hohen Nordens vertritt bei Heardinsel eine ähnliche stachliche Art. Ein Amphipode, dessen Kopf in einen Augenlosen Rüssel ausgezogen ist, lebt bei Kerguelen in 40–120 F., ein gigantischer nahe Iphimedia in 1600 F. zwischen diesen und den Crozet's, eine Hyperide von 7 cm nur mit rothen Pigmentflecken statt der Augen in grossen Tiefen der Arúsee. Amphipoden in grosser Zahl fand *Nordenskjöld* mit dem Pröven 1875 im nordischen Eismeer. Den arktischen Strom begleiten nordische Arten wie *Eusirus cuspidatus Kroyer*, welche man auf Grönland beschränkt hielt, in englische Meere. Ein bei den Meangisinseln auf Comatula in 500 F. schmarotzender, in den Magensack eingegrabener Amphipode hatte gleich seinen Nebenparasiten die schwarz- und weissgescheckte Farbe des Wohnthiers angenommen."

Compare the Note on Willemoes Suhm, 1876.

1879. Sars, G. O.

Crustacea et pycnogonida nova in itinere 2do et 3tio expeditionis Norvegicæ anno 1877 & 78 collecta. (Prodromus descriptionis.) Separataftryk af Archiv for Mathematik og Naturvidenskab. 4de Bind. 1879. Kristiania, 1880.

The new species of Amphipoda described are:—12. *Anonyx typhlops;* 13. *Anonyx* (*Onisimus*) *turgidus*, since called *Onesimus turgidus;* 14. *Anonyx* (*Onisimus*) *leucopis*, since called *Onesimus leucopis;* 15. *Anonyx* (*Tryphosa*) *pusillus*, since called *Tryphosa pusilla;* 16. *Anonyx* (*Hippomedon ?*) *calcaratus*, since called *Anonyx calcaratus;* 17. *Acidostoma laticornis*, since called *Acidostoma laticorne;* 18. *Phoxus oculatus;* 19. *Harpinia abyssi*, "Syn: Harpina [Harpinia] crenulata, G. O. Sars, Prodromus descriptionis etc.: non Boeck."; 20. *Harpinia carinata;* 21. *Harpinia serrata;* 22. *Harpinia mucronata;* 23. *Urothoë abbreviata;* 24. *Bruzelia serrata;* 25. *Oediceros macrocheir*, since called *Oediceros macrocheir;* 26. *Epimeria loricata;* 27. *Tritropis? appendiculata*, of which Sars remarks, "specimen singulum speciei hujus anomalæ, verosimile ad novum genus referendæ . . . . in prof. 1280 orgyar. captum"; which will probably be the type of the new genus *Cleonardo* established in this Report; 28. *Metopa spectabilis*, "Syn: Metopa Alderi, G. O. Sars. Prodromus descriptionis etc, ex parte; non Sp. Bate"; 29. *Metopa æqvicornis;* 30. *Cressa abyssicola*, since called *Danaia abyssicola;* 31. *Ampelisca odontoplax;* 32. *Ampelisca minuticornis;* 33. *Byblis abyssi;* 34. *Melita pallida;* 35. *Autonoë megacheir;* 36. *Podocerus assimilis;* 37. *Podocerus brevicornis*, "Syn: Podocerus latipes, G. O. Sars, Prodr. Crust. et Pycnogonid., non Krøyer"; 38. *Podocerus longicornis*, a preoccupied name since changed to *Podocerus tenuicornis;* 39. *Cerapus megalops*, since called *Erichthonius megalops;* 40. *Glauconome petalocera*, "Syn: Glauconome planipes, G. O. Sars, Prodromus descriptionis etc,; non Norman," since called *Uneiola petalocera;* 41. *Dulichia septentrionalis*, since identified with *Dulichia tuberculata*, Boeck; 42. *Dulichia macera;* 43. *Caprella microtuberculata*. For further observations on some of these species see Note on G. O. Sars, 1885.

1879. Smith, Sidney I.

Occurrence of Chelura terebrans, a crustacean destructive to the timber of submarine structures, on the coast of the United States. Proceedings of United States National Museum. pp. 232–235. Fig. 1.

The synonymy is given, as well as a description, and other notes. Compare Note on Verrill and Smith, 1874, p. 436.

1879. Stebbing, T. R. R.

Sessile-eyed Crustacea of Devonshire. Supplementary List. (Read at Ilfracombe, July 1879.) The Transactions of the Devonshire Association for the Advancement of Science, Literature, and Art. 1879. 9 pages.

A suggestion made by the Rev. A. M. Norman is here mentioned that *Grayia imbricata*, Sp. Bate, is the young of *Amathilla sabini*, Leach. It is proposed to unite the species *Nænia excavata*, Sp. Bate, with that author's *Nænia rimapalmata*.

1879. Stebbing, T. R. R.

On Hyale Lubbockiana (=Allorchestes imbricatus, *Sp. Bate, and* Nicea Lubbockiana, *Sp. Bate*). The Annals and Magazine of Natural History. Vol. IV. Fifth Series. November. London, 1879. p. 396.

These names I now regard as synonyms of *Hyale pontica*, Rathke.

1879. Studer, Th.

Verzeichniss der bis jetzt auf Kerguelensland beobachteten Thierspecies nebst kurzen Notizen über ihr Vorkommen und ihre zoogeographischen Beziehungen. Archiv für Naturgeschichte. Fünf und vierzigster Jahrgang. Erster Band. Berlin, 1879. pp. 104–141.

Lists are here given both of the literature of the subject and of the species of animals. The Amphipoda are enumerated at page 126. They are named as follows:—*Atylus australis*, Miers; *Atylus*, n. s.; "*Anonyx Kergueleni*," Miers; "*Lysianassa Kidderi*," Smith; *Hyale villosa*, Smith; *Leucothoe* sp.?; *Podocerus ornatus*, Miers.

In the "Vertheilung der Meeresthiere," I notice also, at p. 136, among Crustacea, "Eusirus? 150 Faden Sandschlamm." *Atylis australis*, Miers, is noted as approaching *Atylus fissicauda*, Dana, from Valparaiso.

1879. Thomson, George M., born 1848 (Chilton).

New Zealand Crustacea. Transactions of the New Zealand Institute. 1878. Vol. XI. 1879. pp. 235–248. Pl. X. B. C. D.

Of "*Talitrus ? novæ-zealandiæ*, Dana (*Orchestoidea ? nori-zealandiæ*)," Mr. Thomson remarks, "This species is certainly the female of *Talorchestia quoyana*," M.-Edw. "The males of the *Talitrus*, and the females of the *Talorchestia*, have never yet been described as such." The new species described are *Nicea novæ-zealandiæ; Nicea fimbriata; Nicea rubra; Dexamine pacifica; Atylus danai; Phoxus novæ-zealandiæ; Calliope didactyla; Calliope fluviatilis; Gammarus barbimanus; Platyscelus intermedius*, with the remark appended. "I have named this species as above, from the fact that it is almost intermediate between the only two species hitherto described—*P. rissoinæ*, Bate, and *P. serratus*, Bate"; *Caprella caudata*, recorded by Mayer as a near relation, if not a local variety, of *Caprella æquilibra*, Say; *Caprellina novæ-zealandiæ*, according to Mayer identical with *Caprella longicollis*, Nicolet, the genus only, not the species, being new.

Caprellina, new genus, is thus defined:—"Body cylindrical. Cephalon confluent with first segment of pereion. Pleon rudimentary. Gnathopoda subchelate; branchiæ attached to second pair. First two pairs of pereiopoda represented by the branchiæ attached to their respective segments; third pair feebly developed; two posterior pairs well developed, subequal. First and second pairs of pleopoda rudimentary in the male, rest obsolete."

"This genus appears to be intermediate between *Cercops* and *Caprella*. From the former, it differs in not having the pleopoda developed, but agrees with it in having branchiæ attached to the second gnathopoda. In respect to this latter character it differs from its nearer ally *Caprella*, and also in having the third pair of pereiopoda feebly developed." Mayer, instead of placing the genus between *Cercops* and *Caprella*, sets it next to *Proto*, in common

with which it has a mandibular palp, the flagellum of the lower antennæ consisting of more than two articulations, branchiæ on the second, third and fourth peræon-segments, and a pleon with two pairs of appendages in both sexes.

The three species of *Nicea* may be assigned to the genus *Hyale*, as in each the telson is deeply divided; for the species of *Calliope*, the altered generic name *Calliopius* has since been adopted; *Gammarus barbimanus* has been recognised as identical with *Corophium lendenfeldi*, Chilton, 1883, and by Thomson and Chilton, 1886, called *Corophium barbimanum*, with *Haplocheira typica*, Haswell, in the synonymy; but the right name will, I think, be *Haplocheira barbimanus*; *Platyscelus intermedius*, if really distinct from *serratus*, which Claus identifies with *ovoides*, will become *Dithyrus intermedius*. For the species described as *Lysianassa kröyeri*, Spence Bate (*Ephippiphora kröyeri*, White), see Note on Miers, 1884, and Note on Thomson and Chilton, 1886; *Paramœra tenuicornis*, Miers, Mr. Thomson says "must be replaced in the genus proposed by its original describer, Dana, viz., *Melita*." The sexes and young of *Themisto antarctica*, Dana, are described, but specimens which Mr. Thomson has had the kindness to send me, with this name attached, belong, I believe, to the genus *Parathemisto*. The minute illustrations to this paper by no means fairly represent Mr. Thomson's own drawings, for "instead of lithographing the plates, the draughtsman *traced* them on to a large sheet, from whence they were photo-lithographed."

1879. Thomson, George M.

Additions to the Amphipodous Crustacea of New Zealand. The Annals and Magazine of Natural History. Vol. IV. Fifth Series. No. 23. November. London, 1879. pp. 329–333. Plate XVI.

A short description is given of Mr. Thomson's earlier paper in the New Zeal. Inst. Trans., and four more species are added to the local fauna:—"1. *Amphithonotus lævis*, sp. nov. (Pl. XVI. figs. 1–4.)." "Though agreeing closely in generic characters, this species is very distinct in appearance from *A. Edwardsii*, as figured in the British Museum catalogue, and also apparently from *A. spiniventris*, Costa," in regard to which it must be observed that, of the two species compared, the former belongs to the genus *Rhachotropis*, the latter to *Dexamine*; "2. *Aora typica*, Kröyer," in which "the superior antennæ were about as long as the animal; the propodos of the first gnathopoda, as well as the last four joints of the second gnathopoda, were very hairy; telson quite smooth"; "3. *Microdeutopus maculatus*, sp. nov. (Pl. XVI. figs. 5–8)," accepted by Thomson and Chilton, 1886, as the female of Aora typica, Kröyer; "4. *Cyrtophium cristatum*, sp. nov. (Pl. XVI. figs. 9–15)." "This species differs from the generic characters of *Cyrtophium* in possessing an appendage on the superior antennæ; but as it agrees in every other respect, I do not feel justified in placing it in a new genus. It comes nearest to *C. brasiliense*, obtained by Dana in the harbour of Rio Janeiro." Dana's species here referred to is *Platophium brasiliense*.

1879. Wrześniowski, August.

Vorläufige Mittheilungen über einige Amphipoden. Zoologischer Anzeiger. II. Jahrgang. 1879. pp. 175–178, 199–202.

This paper, the first of an important series, is on new Peruvian species of the genus *Hyale*, Rathke, which genus, in the wider sense accepted by Boeck and Stebbing, he thinks may be conveniently divided into two subgenera, the one *Allorchestes*, Dana, with telson simple

rim entire, the other *Hyale* sensu strictiore (*Nicea*, Nicolet), with the telson more or less divided. Professor Wrześniowski does not appear to have seen Faxon's paper, dated June 1876, on the Fauna of Lake Titicaca, which discusses the genera *Allorchestes* and *Hyale*, and also shows that the species of *Hyale* here described from the fresh-water springs of the Peruvian Cordilleras are not the first of their genus or subgenus known from fresh water, as the Professor supposes.

To the subgenus *Allorchestes*, "Telson einfach, ganzrandig," are assigned three new species, "*Hyale Jelskii*," "Fundort. Süsswasserquelle am Ostabhange der Cordilleren. Pumamarca, 8000′ über der Meeresoberfläche"; "*Hyale Lubomirskii*," "Fundort Süsswasserquelle am westlichen Abhange der Cordilleren. Pacaunayo, 8000′ über der Meeresoberflache"; "*Hyale Dybowskii*," "Fundort. Süsswasserquelle am Westabhange der Cordilleren. Paucal. Montana de Nancho, 7000′ über der Meeresoberfläche."

In the remarks common to all the species it is stated that, in the side-plates of the last six or five pairs of feet, above the branchiæ, are inserted cylindrical structures, closed at the point, which are considered to be accessory branchiæ (Nebenkiemen). To "*Hyale Jelskii*" he assigns, "Nebenkiemen am 2–5. Fusspaare einfach, von vorn nach hinten immer an Länge zunehmend, am sechsten Fusspaare am längsten und doppelt, am siebenten Paare fehlend." "*Hyale Lubomirskii*" has "Nebenkiemen einfach, am 2.–7. Fusspaare eingefügt. Am zweiten Fusspaare erscheinen sie ganz rudimentär, an den zwei folgenden etwas grösser, doch immer sehr klein, an den drei folgenden Fusspaaren länger als die eigentlichen Kiemen." "*Hyale Dybowskii*" has "Nebenkiemen am 3.–7. Fusspaare, einfach."

With these species Wrześniowski would group *Hyale* (*Allorchestes*) *piedmontensis*, Sp. Bate, *Hyale* (*Allorchestes*) *microphthalma*, Sp. Bate, *Hyale* (*Allorchestes*) *hirtipalma*, Dana, *Hyale* (*Allorchestes*) *media*, Dana, and *Hyale* (*Allorchestes*) *rubricornis*, Stimpson.

To the subgenus *Hyale*, "Telson mehr oder weniger gespalten," are assigned the new species, "*Hyale Stolzmani*," "keine Nebenkiemen," found under stones on the sea-coast, and as its nearest relations, *Hyale* (*Nicea*) *plumicornis*, Heller; *Hyale* (*Nicea*) *fasciculata*, Heller; *Hyale* (*Nicea*) *nudicornis*, Heller; *Hyale* (*Nicea*) *macronyx*, Heller; *Hyale* (*Nicea*) *camptonyx*, Heller; *Hyale* (*Nicea*) *schmidtii*, Heller; *Hyale* (*Nicea*) *rudis*, Heller; *Hyale* (*Orchestia*, *Allorchestes*) *perieri*, Lucas, Grube; *Hyale* (*Allorchestes*) *imbricata*, Bate, Stebbing.

1879. Wrześniowski, August.

Vorläufige Mittheilungen über einige Amphipoden. Ueber *Goplana polonica* n. g. et sp. Zoologischer Anzeiger. II. Jahrgang. 1879. pp. 299–302.

The name *Goplana* is said to designate in Polish a water nymph. The genus is thus defined:—Upper antennæ longer and stronger than the lower and provided with a short accessory flagellum. First and second gnathopods subcheliform, subequal. Last uropods one-branched. Telson simple, emarginate. *The three last pleon-segments coalesced.*

The last character is said to be its chief distinction from *Crangonyx*, Sp. Bate. A description of the species and its habits follows, containing some sufficiently remarkable particulars.

On the second gnathopod and first peræopod of both sexes on the front rim of the fleshy part of the side-plate are seated a pair of cylindrical accessory branchiæ; to the fourth and fifth peræopods and to the front rim of the first abdominal segment similar but simple accessory branchiæ are attached. They are entirely wanting on the second and third peræopods. [In the original some errors have crept into the printing, which I have ventured to correct according to what I suppose to have been the author's intention.] In the male from the

second gnathopod to the fifth peræopod lamellate appendages are present, homologous according to their position and structure to the lamellæ of the female brood-pouch.

In copulation the considerably smaller male attaches itself with its subcheliform gnathopods to the back of the fifth or sixth peræon-segment of the female so that its body forms almost a right angle with that of the female. Then it bends its body in an arc towards the abdominal surface of the female, the point of its tail remaining at a good distance off from her. Spasmodic movements are made by the male from time to time. As a rule two suitors attach themselves at the same time to the female. The brood-pouch of the female at this period appears always to be filled with eggs.

Goplana polonica generally progresses with an upright walk, and even climbs the smooth walls of a glass aquarium. It swims on its back, but not with facility; at the bottom of the water it hops about in an agile manner.

Gammarus ambulans, Friedrich Müller, is a near relative of this fresh-water species, and is therefore renamed *Goplana ambulans*. It may well, I think, be questioned whether *Goplana polonica* is more than the adult of Muller's species.

1879. Wrześniowski, August.

Vorläufige Mittheilungen über einige Amphipoden. Zoologischer Anzeiger. II. Jahrg. 1879. pp. 322–325, 348–351.

"*Lada Chałubiński*" is described, a new genus and species from shore-pools in the Gulf of Chinbote, Peru. It is distinguished from the hitherto described species of *Melita* by the absence in the male of a finger on the first gnathopods, and by the peculiar structure of the hand, in which the front and upper edge forms a short, thick, hook-formed, downward-curved process. The finger in the second gnathopods closes against the inner surface of the hand, as is the case with *Melita palmata*, Leach, and the Brazilian species, *Melita messalina*, F. Müller, and *Melita insatiabilis*, F. Müller. The author is rather doubtful whether to insist on a new genus for his species, or to regard it as a subgenus of *Melita*, in close relationship with the species just mentioned.

Lada in the Slav mythology represents the goddess of love.

The females are distinguished from the males by shorter antennæ, differently formed hands of the gnathopods, the first not being fingerless, and by a hooked process on the antero-inferior edge of the coxa of the fourth peræopod. It is remarked that a similar process in *Melita palmata* is wrongly attributed by Boeck to the male instead of the female.

"*Mæra Miersi*," a new species collected by Herr J. Stolzman together with *Hyale stolzmani* and *Lada chałubińskii*, belongs to the division of the genus *Mæra* which is made by Sp. Bate to form a separate genus *Megamoera*. The differences between the two appear so slight that Wrześniowski follows Heller and Boeck in re-uniting them.

Callisoma Branickii, a new species briefly described by Professor Wrześniowski in 1874, is here compared with *Callisoma krøyeri*, Bruzelius. The latter species is stated to have, in common with *Callisoma branickii*, *Callisoma crenata* and *Callisoma lupei*, on the back of the fourth pleon-segment a saddle-shaped depression, the existence of which is not noticed by Bruzelius, and expressly denied by Boeck. The distinctions given between *Callisoma branickii* and *Callisoma krøyeri* refer to measurements of the eyes, antennæ and hand of first gnathopods, to the number of joints in the flagella of the upper antennæ, and to the armature of the inner rim of the finger of the first gnathopod. To my mind they together barely amount to the value of specific difference. In regard to the saddle-shaped depression on the fourth pleon-segment, it may be noted that this is extremely common among the Amphipoda, but that, even in species which have the character well developed, it is often

concealed beneath the preceding segment. The telescoping of these two segments is facilitated by the depression, and is of obvious importance for the bending and unbending of the pleon.

1879. Wrześniowski, August.

Vorläufige Mittheilungen über einige Amphipoden. Beiträge zur Anatomie der Amphipoden. Zoologischer Anzeiger. II. Jahrgang. 1879. pp. 447–450, 465–469, 487–491, 511–515, 536–540, 564–569.

Also in a Separat-Abdruck, 24 pp.

These valuable contributions to the anatomy of the Amphipoda are based chiefly on *Goplana polonica*, *Pallasea cancellus*, *Callisoma branickii*, and two varieties of *Gammarus pulex*. The matrix or hypodermis is shown to be completely distinct from the adipose tissue, the former, as examined in *Pallasea cancellus*, presenting a typical stratified cylindrical epithelium, having its small granular cells provided each with a nucleus and nucleolus, the latter consisting of relatively large, rounded and somewhat angular, very pale cells connected together without intercellular substance. This latter forms a sheath for the alimentary canal, and fills the space between it and the heart, for which it forms the serous covering, intercellular substance here making its appearance. By flat or string-like offshoots it connects the various internal organs with one another and with the external covering of the body. On various parts of the inner surface of the matrix it forms a layer of connective tissue to which the offshoots above-mentioned are fastened. The fat-drops, which are met with most constantly between the alimentary canal and the heart, are rare or almost entirely wanting in fasting Amphipods, but abundant in well-fed specimens.

The muscular system in *Goplana polonica* is thus described. The flexors of the back present two separate systems. The one consists of oblique muscles running from above and behind obliquely forwards and downwards. Each muscle begins halfway up the segment and inserts its lower end on the ventral surface of the preceding segment. These are wanting in the four first segments of the body, but present from the fifth to the tenth, the three following segments, which in *Goplana polonica* are coalesced, possessing a common very strong oblique flexor. The other set of flexors is thus constituted. On either side in the lower part of the segments run, from one segment to the next, and interlaced, pairs of muscles parallel to the ventral surface of the body. These muscles are united at the places of insertion, so that they form elongated links. These Wrześniowski calls longitudinal flexors of the back. The regular arrangement of these prevails from the fourth to the ninth segment of the body. Only the upper muscle enters the tenth segment. The three coalesced segments have a single very long longitudinal flexor. In the front part of the body these muscles run without interruption from the hinder rim of the head to unite at a common place of attachment in the fourth segment of the body.

The extensors, which are considerably stronger than the flexors, form strong tracts on either side, extended between the front rims of neighbouring segments. The front divisions of the extensors and flexors raise and lower the head.

The abdominal feet are moved by a complicated system of muscles. The first basal joint of each foot possesses an extensor and a flexor, which draw the whole foot forwards and backwards. The two terminal branches of the foot have each a very thin and broad extensor and flexor, running from the upper rim of the basal joint to the commencement of the corresponding branch. Each branch has its own abductors and adductors, the outer

possessing two abductors and a very strong, thick and long adductor, the inner branch having simple and very weak muscles.

Notes are given (pp. 465–6) on the nerve-system as displayed in *Goplana polonica* and the varieties of *Gammarus pulex*. The "auditory hairs" on the upper antennæ of *Callisoma branickii* are minutely described, and from their likeness in structure and nerve-apparatus to the auditory hairs and auditory nerves of the Decapods, as described by Hensen, it is argued that a like function may be reasonably attributed to these organs in the Amphipods, notwithstanding Leydig's doubts on the subject. The plumose hairs of the last uropods are not considered to have anything in common with the function of hearing. A detailed account is given of the antennary nerves in *Callisoma branickii*.

In describing the so-called "calceoli," the author refers to the work of Dybowsky as showing in agreement with his own observations that these organs are to be found sometimes on the upper as well as the lower antennæ, and in the female as well as the male sex. He thinks it clear that the "trumpet-mouthed auditory cilia" on the upper antennæ of *Gossea microdentopa*, Sp. Bate, and the oval "auditory cilia" on the upper antennæ of *Bathyporeia robertsoni* of the same author, are really "calceoli."

In *Callisoma branickii* the calceolus presents a thin-walled, flattened, pedunculate vesicle, nearly of the same form as figured for *Gammarus pulex* and *Gammarus neglectus* by de la Valette, G. O. Sars and Leydig. A large circular ganglion-cell lies close to the base of the calceolus, but the entrance of the nerve into it could not be made out. In the peculiar lanceolate calceoli of *Goplana polonica*, nerve-fibrillæ were traced right to the sharpened rims of these organs, with a fan-like distribution. The calceoli are here regarded as apparatus for smelling in agreement with the view of G. O. Sars. [This view had earlier been advocated by de la Valette and by Bate and Westwood, Brit. Sess. Crust., vol. i. p. 87, 1863; H. Blanc would refer them to the sense of hearing.]

In *Hyale jelskii*, the author found on the front rim, both of the outer and of the inner lobe, of the second maxillæ three rows of bristles, each row consisting of differently formed bristles. In the uppermost row no connection was found with the nerves, but in the lowest and middle rows this connection was made out, and the suggestion is offered that the lowest row are perhaps organs of touch and the middle row organs of taste.

Numerous observations are given (p. 511 f.) on the intestinal canal and its appendages. The whole length of this organ appears to be sheathed in a layer of the adipose tissue (Leydig's *serosa*). The muscular covering of the mid-gut consists chiefly of transverse threads, that of the hind-gut of an outer layer of transverse, and of inner, thick, separate, longitudinal muscles. The membrana propria of the mid-gut is very thin, that of the hind-gut thick, consisting of a transparent, homogeneous matrix, including groups of spindle-shaped cells which run out into thin, long processes at both ends. In the central part of the mid-gut he believes that no cuticula or intima exists. [In the Caprellidæ Mayer (p. 147) finds, apparently throughout, a fine, not chitinous, intima.] Between the mid- and hind-gut is an outer projection and an inner, ring-shaped flap or valve, with its free edge directed backwards, so that what is passing through the body can easily go from the mid- into the hind-gut, but not easily on the reverse route. In *Pallasea cancellus* the hind-gut has six rows of dilators (not to be confounded with sphincters).

The appendages of the intestine are next discussed. The cæcal diverticulum behind the stomach is designated neck-gland (Nackendrüse.) To this expression Mayer takes exception as not very appropriate. Mayer also remarks that in the Caprellidæ there are at this part of the intestine not one diverticulum only, but a pair. The muscles, cells and vesicles of the liver-tubes are minutely described. The cylindrical glands, opening, according to the author, at the beginning of the hind-gut, close behind the above-mentioned valve, are called rectal-glands (rectaldrüsen.) The view of G. O. Sars that these cylindrical glands are homologous

with the Malpighian vessels of insects is accepted. Mayer maintains that these structures which lie on the borders of the mid- and hind-gut belong morphologically to the former, the mid-gut and the cæcal appendages being sharply distinguished from the hind-gut by an interruption of the epithelium, and by the absence from the former of the chitinous intima. He agrees with Nebeski that, whatever their function, they cannot be morphologically compared with the Malpighian vessels of insects. In addition to the other appendages, in *Goplana polonica* Wrześniowski finds a previously undescribed gland, which lies in the telson, and has a round opening in the terminal part of the hind-gut just before the anus. This he calls the anal gland (Afterdrüse).

A description is given (p. 537) of the windings of the antennary gland in *Goplana polonica*, and of the structure of its tissues. A very accurate account follows of the circulation of the blood, mostly already published in 1877. For a summary of the results see Note on Delage, 1881. Wrześniowski justly gives de la Valette the credit of having observed the three pairs of venous ostia of the heart in the second, third and fourth segments of the peræon respectively, with their oblique direction, on the right side from above and in front downwards and backwards, and on the left side from behind and above forwards and downwards, so that in each pair the slits cross one another at an acute angle. The heart extends from within the hinder limit of the head to the middle of the sixth peræon-segment in *Goplana polonica*, to nearly the end of the fifth in *Pallasea cancellus*. In each segment of the peræon it is fastened to the back by a pair of upper, and to the sides of the body by a pair of lower, wing shaped muscles; the front end in the head has only the upper pair.

The arterial ostia, one in the hindermost part of the head, the other in the fifth or sixth peræon-segment, are provided with a complicated valve-apparatus. In each a membrane-like diaphragm is extended, with a simple slit in the centre. The edges of the slit are provided with a sphincter-like muscle, and in the whole surface of the diaphragm the author thought he could perceive annular, very delicate muscle-threads. From the edges of the diaphragm on either side ascends a muscular membrane, finding attachment to the dorsal wall of the heart. During the systole the lateral muscular membranes contract energetically, opening the slit in the diaphragm; in the diastole they relax, while the muscle-threads of the diaphragm contract, and act as sphincters to close the slit, so that the cavity of the heart is now completely shut off from that of each aorta. To prevent the valves bulging in into the cavity of the heart, a pair of trabeculæ are fastened, on one side to the rims of the diaphragm-slit, on the other to the ventral wall of the heart. The lateral, venous ostia have each an inwardly projecting valve, with its outer and inner lips provided with sphincter-like muscles. The sphincter of the outer lip is formed by muscles of the wall of the heart, which at the lower angle of the slit separate, to re-unite at the upper angle. The inner lips are provided with a separate sphincter. At the systole first the inner and then the outer slit of the ostium closes.

Lateral arteries are not found in the Gammaridæ, so far as observed by Wrześniowski, Claus, [and Delage], although in the Hyperina two or three pairs have been found by Claus. The anterior aorta clings to the upper wall of the stomach, bends sharply down over its front upper edge, descends the front wall of the œsophagus and ends abruptly close to the floor of the head. During this course, in *Goplana polonica*, three branches are given off on either side. The uppermost branch originates just in front of the geniculate bend of the aorta, and provides for the upper antennæ. The middle branch goes down from the bend of the aorta and runs to the eye, where it appears to end. The lowest branch separates from the main stem close to its termination, and provides for the lower antennæ. [In *Talitrus locusta*, Delage describes three arteries proceeding from the anterior extremity of the heart, centrally the upper aorta with a valve, on either side facial arteries, in which he could not discover valves, though for all that they might exist. The facial arteries run at first upwards and

outwards towards the eye, then, making a somewhat abrupt elbow, advance into the lateral parts of the face, ending on a level with the base of the mandibles. Their ramifications supply the massive muscles of the mouth-organs. The upper aorta at first ascends towards the antennæ, then bends forwards and terminates in the upper lip. In its course the aorta forms two vascular rings situated in a vertical median plane, the one round the brain, the next round the cohering bases of the antennary or "renal" glands. From the lower branch of the pericerebral ring springs a minute single artery which supplies the œsophageal nerve-ring. From the upper branch of the pericerebral ring two pairs of lateral branches are given off to the antennæ. Two other pairs originate, one between the pericerebral and perirenal rings, the other beyond the perirenal ring. Finally, a fifth pair of branches forms a perioesophageal vascular collar, with various ramifications to supply the mouth-organs.]

The hinder aorta runs above the intestinal canal to the telson. In *Goplana polonica* it is furcate at the end, each terminal branch being very short and opening abruptly into the body-cavity. Almost in the middle of the compound segment, the aorta gives off a pair of very short lateral branches, embracing the rectal gland and ending abruptly. The aorta, however, terminates differently in other species.

The anterior blood-current flowing from the terminal opening of the corresponding aorta moves in the head from before backwards, rises obliquely upwards, enters the thorax just below the stomach, and pursues its course on either side of the intestine and over the liver-tubes. On the way it gives off lateral currents to the mouth-organs and the four first feet with their branchiæ, but does not reach beyond the fourth peræon-segment. From the hinder aorta arise on either side two currents, an anterior from the lateral branch (in *Goplana polonica*) or the anterior opening (in *Gammarus pulex*), a posterior from the terminal fork (in *Gammarus polonica*) or the terminal opening (in *Gammarus pulex*). Both currents on either side of the body descend to begin with towards the ventral surface, unite between the articulations of the second and third uropods, and form a common stream which runs forwards on the ventral surface, but at the articulation of the first uropods with most of its mass ascends, and then flows forwards, divided into two parallel streams. The one stream approaches the intestine just under the hinder aorta, the other, somewhat deeper, approaches the liver-tubes. The ventral stream appears to be of subordinate importance. From the hinder streams lateral currents go to the pleon-appendages and to the four hinder peræopods. Thus the fourth peræon-segment is a boundary which is overstepped neither by the anterior nor the posterior blood-currents, and in it they all unite, and flow on into the second peræopod.

In the pleopods the arterial current descends the front margin, in the uropods the hind margin, while the venous current ascends the opposite side in each set. [Between the four first and the three last feet of the peræon, there is a similar diversity in the direction of the currents. See Delage, 1881, and Claparède, 1863; Wrześniowski gives a reference also to Claparède, Études sur la circulation chez les aranées du genre Lycosa, 1875.] Into each foot of the peræon two arterial currents enter, but only a single venous current returns. All these streams pass special openings in the articulation between the side-plate (coxa) and the segment, as well as in that between the side-plate and the first joint of the limb (coxa and basis). Each foot possesses a common venous sinus, lying in the under part of the segment above the side-plate, and bounded by the flexors and extensors of the foot. Into this sinus gathers all the blood running back from the foot and its appendages towards the heart. In each branchia the arterial current traverses the hinder rim and passes over by means of numerous transverse currents into the venous current which pursues its course on the front rim. The venous current of each branchia opens into the common venous sinus of the foot, so that the blood oxidised in the branchia flows direct to the heart, without contributing to the nourishment of the foot.

In each foot of the peræon the arterial blood courses as well by the anterior as the posterior rim of the side-plate. In the four first pairs the anterior stream supplies the side-plates and the accessory branchiæ (where such exist). The cavity of the side-plate is formed into three longitudinal canals, which on the lower rim unite, and besides communicate with one another by numerous cross canals. The arterial current flows down in the front and middle canals, while the venous current ascends in the hinder. The hinder arterial current of the foot passes partially into the branchiæ, partially into the foot itself, and partially into the lamella of the brood-pouch in the female or its homologue in the male. In the three last pairs of peræopods the front arterial current provides for the foot and its accessory branchia, the hinder sends its secondary currents into the branchia, the side-plate and the marsupial lamella. In the side-plate the current runs round beside the rim. [With this account should be compared Dr. Delage's account of the circulation in corresponding parts of *Talitrus locusta*.]

From each appendage of the peræon and pleon a single venous current proceeds. All these take their way to the dorsal side of the body-cavity and debouch in a spacious venous sinus, bounded below by the intestine and its adipose tissue, on the sides by the muscles of the back, and above by the back of the animal. [This Delage calls the pericardiac sinus, and assigns it a bounding membrane of its own, open only to the thirteen pairs of pericardiac vessels.] In this sinus, which lies over the hinder aorta and over the heart, a hinder and an anterior current are to be distinguished. The former flows from the hinder end of the body forwards to the third peræon-segment, the other has a backward direction and reaches the same segment. In the hinder current debouch the venous currents of the five last peræon-segments and of the whole pleon, to the anterior belong the venous currents of the antennæ, the head and the two first peræon-segments.

At the diastole the blood collected in the (pericardiac) sinus passes through the gaping ostia into the heart. This movement is helped by the upper wing-like muscles, as by their contraction the sinus in its horizontal and perpendicular diameter is contracted, and its two streams in this way are pressed towards the third peræon-segment, and rush with greater energy through the slits, the heart acting like a suction pump. The front slit takes only the blood of the front current, the hindmost of the hinder, the middle the leavings of both.

It thus appears that the arterial currents from the two aortas and their branches wash various organs of the body, as the intestinal canal and the nerve-centres, and then in full tide press into the articulated appendages, finally to quit them as venous currents and pass into the dorsal sinus. Wrześniowski found no direct bending round of the hinder arterial current into the dorsal sinus, such as Claus has described in *Phronima sedentaria*. The whole blood-content of the venous dorsal sinus passes, he says, direct into the heart, without previously traversing the branchiæ as Spence Bate states, Sessile-eyed Crustacea, i. p. xxxii. On the contrary the branchiæ receive their blood from the same arterial streams which supply the feet, and the contents of the venous dorsal sinus present a mixture of the blood returning from all parts of the body, which has been subjected not only in the branchiæ, but, at least partially, also in the antennæ, side-plates and legs, to oxygenation. A separation of the arterial and venous blood is therefore not arranged for.

The blood-plasma in young specimens of *Goplana polonica* appears of a yellowish-red colour, in adults of more or less greenish, sometimes even emerald-green hue. The body becomes paler, when the blood is drained away. The blood-corpuscles in this species are of considerable size, consisting of a soft, granular protoplasm, in which clear, pseudopodial-like processes sometimes make their appearance. More or less numerous fat-drops in the plasma of the blood circulate with it throughout the body.

1880. Asper.

Beiträge zur Kenntnis der Tiefseefauna der Schweizerseen. Zoologischer Anzeiger. III. Jahrg. 1880. pp. 130–134, 200–207.

In some of the lakes a Gammarid was met with, which strikingly reminded Dr. Asper of the common *Gammarus pulex*. The lake-form, however, was smaller and of a glassy transparency. Specimens from depths of 140 and of 60 mètres possessed beautiful organs of vision, with clearly observed crystal-cones. At Wädensweil, at a depth of 40 mètres, along with seeing forms were found blind specimens agreeing in the smallest detail with "*Niphargus Forelì*" from the lake of Geneva. Specimens from Oberrieden Dr. Asper regards as intermediate forms between *Gammarus pulex* and the "Foreli" variety of *Niphargus puteanus*.

1880. Claus, C.

Grundzüge der Zoologie. Vierte durchaus umgearbeitete und verbesserte Auflage. Erster Band. Marburg, 1880.

The Arthrostraca (Amphipoda and Isopoda) occupy pages 576–600. The Amphipoda are defined as "Ringelkrebse mit seitlich comprimirtem Leib und sieben (seltener sechs) freien Thoracalsegmenten, mit Kiemen an den Brustfüssen und langgestrecktem (ausnahmsweise rudimentärem) Abdomen, dessen drei vordere Segmente ebensoviel Schwimmfusspaare tragen, während die drei hintern mit ebensoviel Paaren nach hinten gerichteter sog. Springfüsse besetzt sind." The first suborder Læmodipoda has two families, 1. Caprellidæ; 2. Cyamidæ. The second suborder, Crevettina, has five families, 1. Dulichiidæ; 2. Cheluridæ; 3. Corophiidæ, with two subfamilies, Corophiinæ and Podocerinæ; 4. Orchestiidæ; 5. Gammaridæ, with seven subfamilies, Atylinæ, Oedicerinæ, Leucothoinæ, Phoxinæ, Gammarinæ, Lysianassinæ, Pontoporeinæ. The third suborder, Hyperina, has four families, 1. Vibilidæ; 2. Hyperidæ; 3 Phronimidæ, with two subfamilies, Phrosininæ, and Phroniminæ; 4. Platyscelidæ, with five subfamilies, Typhinæ, Scelinæ, Phronoinæ, Lycæinæ, Oxycephalinæ.

Vibilia mediterranea, Claus, is retained. At page 605 it is said that "die ältesten bis jetzt bekannt gewordenen fossilen Podophthalmen sind langschwänzige Decapoden und Schizopoden aus der Steinkohlen-formation (*Palæocrangon*, *Palæocarabus*, *Pygocephalus*)." *Palæocrangon*, however, is an Amphipod, but with a misleading name. See Note on von Schauroth, 1854.

1880. D'Urban, W. S. M.

The Zoology of Barents Sea. The Annals and Magazine of Natural History. No. 34. October 1880. Vol. VI. Fifth Series. London, 1880. pp. 253–277.

The Crustacea brought home from the "Willem Barents" expedition by Mr. W. J. A. Grant, were sent by Mr. D'Urban to the Rev. A. M. Norman and Professor J. O. Westwood, and the Amphipoda are named as follows "Anonyx nugax (*Phipps*), Acanthonotosoma inflatum (*Kröyer*), *Gammaracanthus loricatus* (*Sabine*), Amphithoë læviuscula, Bell ?, Acanthostephia Malmgreni (*Goës*), Tritropis Helleri, *Boeck*, Unciola leucopes (*Kröyer*), *Hyperia cyaneæ* (*Sab.*)." The dates, latitude and longitude, and depths, of the "finds" are given.

1880. Grimm, Oscar.

Beitrag zur Kenntniss einiger blinden Amphipoden des Kaspisees. Archiv für Naturgeschichte. Sechs und vierzigster Jahrgang. Erster Band. Berlin, 1880. pp. 117–126.

On some Blind Amphipoda of the Caspian Sea. By Dr. Oscar Grimm. Translated by W. S. Dallas, F.L.S., from the "Archiv für Naturgeschichte," 1880. The Annals and Magazine of Natural History. No. 26. February 1880. London, 1880. pp. 85–92.

Dr. Grimm says, "*Gammaracanthus caspius*, mihi, from a depth of 108 fathoms in the Caspian, *Boeckia spinosa*, *nasuta*, and *hystrix*, mihi, from depths of 70–150 fathoms in the Caspian, and various species of *Mysis* from the same sea, and from depths down to 500 fathoms, all have well-developed, large, prominent, and black-pigmented eyes. This sufficiently proves that at the depths indicated the visual organ can be and is made use of, as here absolute darkness does not prevail, but only a dark night."

"In the Caspian Sea, at 0° 12′ E. long. (from Baku) and 39° 51′ N. lat., I obtained in a single cast of the dredge ten new species of Gammaridæ (namely *Gammarus pauxillus*, *G. crassus*, *G. Gregorkowii*, *G. portentosus*, *G. coronifera*, *G. thaumops*, *Pandora cæca*, *Iphigeneia abyssorum*, *Gammaracanthus caspius*, and *Amathilinella cristata*), all of which are furnished with eyes, but in very different degrees of development: thus Gammaracanthus caspius has very large round eyes, Gammarus coronifera and Amathilinella cristata long but narrow eyes, Gammarus thaumops triangular unpigmented eyes, and Pandora cæca small unpigmented eyes, which can hardly be endowed with the faculty of sight. A still better example is furnished by the following new Amphipoda discovered by me in the Caspian Sea:—

Onesimus caspius	from the depth of	75–250	fathoms,	
,, pomposus	,,	,,	180	,,
,, platyuros	,,	,,	40 and 48	,,
Pantoporeia microphthalma	,,	,,	80–90	,,
Niphargus caspius	,,	,,	35–90	,,

of which the last two species, together with Onesimus caspius, were also taken in one cast, and, indeed, at a depth of 80–90 fathoms, at 0° 26′ E. long. and 41° 6′ N. lat. Pantoporeia microphthalma and Niphargus caspius possess pigmented but small eyes; of the species of Onesimus some possess red, others (On. caspius) perfectly unpigmented eyes, which, in the last-mentioned species at least, are deprived of the faculty of sight; and with these more or less blind species there live Mysidæ, the large, convex, and black eyes of which certainly absorb a sufficiency of light even in the darkness of the depths."

While taking the quotations from Mr. Dallas's version, I have not followed him in altering his author's *Gammarus coronifera* into *Gammarus coronifer*. It may be observed that the generic name *Boeckia*, is preoccupied, having been used by Malm in 1870, when it forthwith lapsed as a synonym of *Leptocheirus*. *Pantoporeia*, if it be not intended for *Pontoporeia*, is inconveniently near it. *Iphigeneia* makes an even closer approach to *Iphigenia*, a genus of molluscs. *Pandora* is preoccupied over and over again.

Of *Niphargus caspius*, Grimm says, "from this species *N. puteanus* is probably derived. It is possible that it is identical with *N. ponticus*, Czern.; unfortunately I have been unable rightly to determine the latter, as the description which Hr. W. Czernjawsky has given of it appears to be very defective. (See his 'Materialia ad zoographiam ponticam comparatam 1868.') It must, however, be remarked that our *N. caspius* differs in many respects from

the other species of *Niphargus*, and, indeed, from *N. puteanus*, as in its shorter antennæ, the differently formed hand of the last pair of limbs, etc.; so that, perhaps, our species may be regarded as the representative of a new genus between *Niphargus* and *Gammarus*." This, however, he does not establish, but remarks that "*Niphargus caspius* is very probably the 'extinct Gammarid' (see Leydig, Ueber Amphipoden und Isopoden, Zeitschr. f. wiss. Zool. xxx. p. 249) which the other species of *Niphargus* have as their ancestor."

Defective eyes, Grimm explains, are compensated for by other sense-organs; for example, in the male of *Niphargus caspius* the five-jointed main flagellum of the upper antennæ has on its first four joints very large olfactory cylinders, with an aperture at the free extremity of each, "from which, perhaps, as Leydig states, thin hairs may actually be exserted; and from within a nervous branchlet penetrates into each cylinder, and forms a cellular inflation (in the cylinder itself) only to disappear immediately afterwards, as I have observed still better in living examples of another species, namely *Gammarus pirsus*, mihi, at Krasnovodsk." The species of *Onesimus* being mud-burrowers "have no sense-organs on the antennæ and other external parts of the body, as in *Niphargus*," but, on close examination, "we find very highly developed, although concealed, sense-organs on the outer lamellæ of the maxillipedes, which have already been described or figured by different authors. These are short thick stumps with rounded ends, which stand in corresponding cylindrical depressions of the lamella, from which they usually have only the rounded portion projecting. Some of them, however, appear much longer, inasmuch as they project more and also have the extremities more acute; these are the two cylinders standing at the apex of the lamella, which present a transition towards the ordinary setæ, and thus also prove that we have to do with chitinous setæ metamorphosed for a particular purpose." These he proposes to call "taste cylinders."

1880. GROBBEN, CARL.

Die Antennendrüse der Crustaceen. Separat-Abdruck aus den Arbeiten des zoolog. Instituts zu Wien, Tom. III. Heft 1. 18 pp. m. 1 Taf. 1880.

The antennary gland, originally discovered by Leydig, Naturgeschichte der Daphniden, 1860, is described as consisting of two histologically distinct parts, a terminal pocket, Endsäckchen, and a convoluted tube, Harnkanälchen, which, for the Amphipoda, opens in the well-known generally cone-shaped process of the compound basal joint of the lower antennæ. In *Gammarus marinus*, Grobben says, the terminal pocket lies in the dilated basal-joint of the lower antennæ, quite close to the integument, connected with it by trabeculæ. Its shape is reniform; at the hinder end, comparable to the hilus of the kidney, rises the renal tube, which at first runs a short space back, then bends forward, at the same time inclining towards the middle, presently turns upward, again turns back downward, and now in a great arc winding close to the terminal pocket, after a short geniculation runs into the antennary cone, in the apex of which the gland has its outlet. The terminal pocket is lined by an epithelium, the cells of which are arched forwards into the interior of the pocket. The protoplasm is coarsely granular. The exterior is sheathed in a delicate supporting membrane. The protoplasm of the cells lining the renal tube shows a finely fibrous structure, as already noticed by Weismann. The nuclei are oval; towards the cavity the cells were covered by a noticeable cuticula. The terminal section of the tube is formed by cells which completely agree with the matrix-cells of the skin, and which also develop a chitinous cuticula, which passes direct into the cuticula of the skin. This terminal section, which in structure does not agree with the renal tube, but shows the

same structure as the skin, he designates Harnleiter. The expressions Harnleiter and Harnkanälchen sufficiently indicate Grobben's own opinion that the gland in question has a renal function.

1880. Haller, G.

Miscellanea arthropodologica. Beschreibung zweier neuer Caprellen. Zeitschrift für die Gesammten Naturwissenschaften. Dritte Folge. 1880. Band VI. Berlin, 1880. pp. 742–749.

Haller says that he gave the name *Caprella gigantea* to a new species from the North Sea, which he here describes and figures, on account of its great length, 30 mm., before he was aware that Hoek had observed a specimen of *Caprella linearis* 26 mm. long. He likewise describes and figures the male and female of *Caprella dentata*, n. s., from Ischia.

He refers to "Mittheilungen der schweiz. entomolog. Gesellschaft. No. 10. Jahrgang 1880. pag. 671 nebst Tafel," for a preliminary notice of *Caprella gigantea*.

1880. Haswell, William A.

On Australian Amphipoda. From the Proceedings of the Linnean Society of New South Wales. Vol. IV. pp. 245–279. Pls. VII.–XII. 1880.

The new species described and figured are *Talitrus sylvaticus; Talorchestia diemenensis; "Orchestia Macleayana;" Allorchestes rupicola; Allorchestes longicornis; Allorchestes crassicornis; Stegocephalus latus; Amaryllis macrophthalmus; Amaryllis brevicornis*, evidently the same as *Amaryllis macrophthalmus; Nebule algicola; Lysianassa nitens; Lysianassa affinis*, not distinguishable from *Lysianassa nitens; Glycera tenuicornis; Ampelisca australis; Phoxus villosus; "Phoxus Batei;" Pherusa lævis; Leucothoë commensalis; Leucothoë diemenensis; Leucothoë gracilis*, recognised later, together with *Leucothoë diemenensis*, as falling under *Leucothoë commensalis; Melita australis; "Melita (?) Ramsayi,"* afterwards transferred to *Mœra rubromaculata*, Stimpson; "*Megamœra Mastersii;*" *Megamœra diemenensis; Mœra spinosa*, afterwards identified with *Mœra rubromaculata*, Stimpson; *Amphithoë cinerea*, to which probably the two described but unfigured species, *Amphithoë grandimanus* and *Amphithoë setosa*, must be united; *Microdeuteropus australis; Xenocheira fusciata; Haplocheira typica*, probably the same as *Haplocheira barbimanus*, Thomson, sp.; *Cyrtophium parasiticum; Icilius australis; "Proto Novæ-Hollandiæ"; Protella australis; Caprella tenuis*, a species since relinquished by its author. Besides these, *Talorchestia quadrimana* and *Mœra rubromaculata* are described and figured as synonyms respectively of *Orchestia quadrimana*, Dana, and *Gammarus rubro-maculatus*, Stimpson.

In this group are included five new genera; in the family Gammaridæ, subfamily Stegocephalides, the genus *Amaryllis*, thus defined :—

"Superior antennæ with a well-developed appendage. Mandibles with a palp. Maxillipedes with well-developed squamiform plates. Anterior gnathopoda sub-pediform. Posterior gnathopoda imperfectly subchelate. Rami of the fourth and fifth pleopoda styliform; those of sixth pair broad-lanceolate. Telson squamiform, cleft." This genus differs from *Stegocephalus* by the possession of a mandibular palp, and cannot, I think, for that and other reasons, stand in the same subfamily with it.

The genus *Nebule* is thus defined :—"Superior antennæ simple. Mandibles without an

appendage. Maxillipedes with a squamiform process on the basos only. Gnathopoda subchelate; second pair the larger; coxæ of anterior pair well-developed. Fourth pair of coxæ wide, excavated behind to receive the anterior part of the fifth pair. Posterior pleopoda biramous. Telson squamiform." *Nicothoë* was subsequently transferred by Mr. Haswell to the Orchestidæ, and perhaps is synonymous with *Hyale*, Rathke.

In the subfamily Lysianassides, the genus *Glycera* is defined as follows:—"Superior antennæ slender, rather long, provided with an appendage. Mandibles with a palp, the incisive edge not toothed; no accessory plate; anterior margin with a prominent tubercle. Maxillipedes with large squamiform processes on the basal joints. Four anterior pairs of coxæ deeper than their respective segments, the fourth pair slightly produced inferiorly and posteriorly. Gnathopoda filiform, slender; anterior pair smaller than the posterior, imperfectly subchelate; posterior pair subchelate. Posterior pleopoda biramous; the rami broad-lanceolate. Telson double." The name *Glycera*, being preoccupied, was subsequently changed to *Glycerina*.

In the family Corophiidæ, subfamily Podocerides, the genus *Xenocheira* is thus defined:—"Body slender. Coxæ small. Superior antennæ very long, longer than the inferior pair, with a secondary appendage. Mandibles with an appendage. Both pairs of gnathopoda non-subchelate, armed with very long hairs; carpus of posterior pair broad, plate-like, applied to the anterior (dorsal) border of the meros. Posterior pleopoda biramous. Telson simple."

The genus *Haplocheira* is thus defined:—"Body not much compressed laterally. Upper and lower antennæ subequal; superior pair without an appendage; inferior subprediform. Both pairs of gnathopoda simple, fringed with long hair. Posterior pleopoda biramous, with unequal rami. Telson single?"

1880. Haswell, William A.

On some additional new genera and species of Amphipodous Crustaceans. From the Proceedings of the Linnean Society of New South Wales. Vol. IV. pp. 319–350. Pls. XVIII.–XXIV. 1880.

The new species described, and in almost all cases figured, are, *Allorchestes niger* (not figured); *Cyproidia ornata; Cyproidia lineata*, not improbably female or young form of *Cyproidia ornata; Lysianassa australiensis*, to be placed with *Lysianassa nitens*, Haswell, as at most a variety; "*Montagua Miersii*;" *Montagua longicornis* (in which, as in the preceding species, the mandibles not being described, the genus remains doubtful between *Stenothoë* and *Metopa*); *Œdicerus latrans; Œdicerus arenicola*, perhaps, according to Haswell, identical with *Œdicerus fossor*, Stimpson; *Urothoë pinguis; Iphimedia? ambigua; Atylus monoculoides; Atylus lippus*; *Leucothoë noræ-hollandiæ; Harmonia crassipes; Eusirus* [really *Liljeborgia*] *dubius; Maera* [*Paranænia* Chilton] *dentifera; Maera hamigera; Maera viridis; Maera approximans*, probably to be united with *Maera* [*Paranænia?*] *dentifera; Megamæra subcarinata; Megamæra suensis*; "*Megamæra Boeckii;*" *Wyvillea longimanus; Amphithoë quadrimanus; Podocerus australis*; "*Microdeuteropus Mortoni;*" *Microdeuteropus tenuipes* (this being in Chilton's opinion the female, and the preceding species the male, of *Aora typica*, Kroyer); *Microdeuteropus chelifer*; "*Colomastix Brazieri;*" *Cyrtophium dentatum* (in 1886 re-named *Dexiocerella dentata*); *Cyrtophium minutum; Icilius punctatus*, afterwards identified with *Icilius australis; Polycheria* [properly *Tritæta*] *tenuipes; Polycheria* [*Tritæta*] *brevicornis*, unfigured and probably a form of the preceding species; *Caprella echinata*, since transferred to *Protella; Caprella corniyera*, referred later

on to *Hirella*; *Caprella inermis*, a preoccupied name for a species almost beyond doubt identical with *Caprella danilerskii*, Czerniavski, 1868; *Caprella obesa*, also a preoccupied name, the species itself being recognised by Mayer, and accepted by Haswell, as identical with *Caprella æquilibra*, Say.

The new genus *Cyproidia*, in the family Gammaridæ, is thus defined:—"Body broad. Pereion and pleon of equal length. Coxæ of gnathopoda very small. Coxæ of the first and second pairs of pereiopoda enormously developed; and cemented together to form broad and deep lateral shields, concealing almost entirely the gnathopoda and pereiopoda, and extending forwards to the sides of the cephalon, and backwards as far as the posterior border of the sixth segment of the pereion, excavated posteriorly for the amalgamated shallow coxæ of the third and fourth pereiopoda. Coxæ of the last pair of pereiopoda very small. Antennæ subequal, superior without an appendage. Mandibles with a palp. Maxillipedes unguiculate; both basos and ischium armed with small squamiform plates. Gnathopoda subcheliform. Pereiopoda slender. Posterior pleopoda biramous. Telson single." Mr. Haswell subsequently discovered that the coxæ of the third and fourth pereiopoda were not amalgamated, but that the coxa "of the fourth pair is entirely rudimentary and covered by that of the third." This character does not apply to the closely related European species *Stegoplax longirostris*, G. O. Sars, or to *Cyproidia dammoniensis*, Stebbing. The genus *Peltocoxa*, Catta, briefly described in 1875, is perhaps the equivalent both of *Cyproidia* and *Stegoplax*.

The genus *Harmonia* (misprinted *Harmomia* on p. 330, but given correctly on p. 349), is defined as follows, "Coxæ not so deep as their respective segments. Superior antennæ with an appendage. Inferior antennæ longer than the superior pair. Mandibles with a palp. Maxillipedes unguiculate subprediform, provided with a squamiform plate on the basos only. Gnathopoda subchelate, unequal, posterior pair very large. Pereiopoda stout. Posterior pleopoda biramous, the rami short, conical. Telson single, elongate." Mr. Haswell further remarks of this genus that it "has affinities with *Eurystheus* and *Amathia*, but is distinguished from the former by the form of the telson and the stoutness of the pereiopoda, and from the latter mainly by the large size of the posterior gnathopoda." For a different view adopted later, see Note on Haswell, 1885.

The description of the genus *Wyrillea* gives "Coxæ scarcely so deep as their respective segments. Superior antennæ shorter than the inferior pair, appendiculate. Mandibles with an appendage. Maxillipedes exunguiculate, squamiform processes rudimentary. Gnathopoda subchelate, posterior pair very large. Posterior pleopoda uniramous—the ramus large. Telson simple, undivided." The description of the species, *Wyrillea longimanus*, speaks of the "posterior pleopoda with the outer ramus broad," as though there were more than one ramus. The figure which Mr. Haswell gives much resembles *Ischyrocerus* (*Podocerus*) *anguipes*, Kröyer. Mr. Chilton supposes that the description given of the pleopoda is the result of an oversight, and that the genus must be cancelled in favour of *Podocerus*. It must, however, be observed that Mr. Haswell's description of the maxillipeds is quite inconsistent with this conclusion.

As a *genus incertæ sedis* is given the genus *Polycheria*, with these characters, "pereion broad; pleon compressed, more or less carinate. Antennæ subequal; superior pair without an appendage. Mandibles exappendiculate. Maxillipedes with well-developed squamiform process. Gnathopoda small, subchelate. Pereiopoda all prehensile, with narrow basa. Posterior pleopoda biramous with equal rami. Telson double." This genus is evidently synonymous with the genus *Tritata*, Boeck, included in Boeck's subfamily Dexaminæ. It will probably be right to include *Polycheria tenuipes*, Haswell, *Polycheria brevicornis*, Haswell, *Polycheria obtusa*, Thomson, and *Dexamine antarctica*, Stebbing, all under the name of *Tritæta antarctica*.

1880. Haswell, William A.

Preliminary Report on the Australian Amphipoda. The Annals and Magazine of Natural History. No. 25. January 1880. Vol. V. Fifth Series. London, 1880. pp. 30–34.

"Between the amphipodous fauna of Temperate Australia," Haswell says, "as exemplified in Port Jackson and that of tropical Queensland, a well-marked dividing line may be drawn." The characteristic Australian Amphipoda are to be found on and near the shores of the temperate latitudes; within the tropics they are comparatively few and not characteristic. "The Orchestidæ, however, are quite as abundant on sandy and stony beaches in the tropics as in temperate latitudes."

Descriptions are given of the new genera *Cyproidia*, *Amaryllis*, *Glycera*, *Polycheria*, *Xenocheira*, *Haplocheira*, for which see Notes on Haswell, 1880, pp. 511–513. From the present paper the following quotations may be given :—

"Probably nearly allied to *Eusirus* and *Iduna* is a new generic form, which I have named *Macleayia*. It has the superior antennæ appendiculate, shorter than the inferior pair; the mandibles are provided with an appendage; the maxillipedes are exunguiculate, with the squamiform processes rudimentary; the gnathopoda are subchelate, the posterior pair being very large; the posterior pleopoda have one large ramus; and the telson is small and undivided." [The same definition (see p. 513) is given for *Wyrillea*, the name *Macleayia* being dropped without explanation.]

"In *Chloris* (mihi) the antennæ are well developed, the superior pair shorter than the inferior and provided with an appendage; the mandibles are palpigerous; the maxillipedes unguiculate, subpediform, provided with a squamiform process on the basal joint only; the gnathopoda are subchelate, unequal, the second pair being very large; the posterior pleopoda are biramous, with short, conical rami; and the telson is single and elongate." The same definition is given for *Harmonia* (see p. 513), the name *Chloris* being dropped, no doubt for the sufficient reason that it was preoccupied.

1880. Haswell, William A.

On some new Amphipods from Australia and Tasmania. From the Proceedings of the Linnean Society of New South Wales. Vol. V. pp. 97–105. Pls. V. VI. VII. 1880.

This paper includes figures and descriptions of *Talitrus assimilis*, n. s.; *Talorchestia limicola*, n. s.; *Talorchestia terræ-reginæ*, n. s.; *Talorchestia* (?) *marmorata*, n. s.; *Talorchestia pravidactyla*, n. s.; *Talorchestia quadrimana* (Dana), var.?; *Aspidophoreia diemenensis*, n. s.; *Atylus microleuteropus*, n. s.; *Atylus megalophthalmus*, n. s.; *Pherusa australis*, n. s.; *Mœra crassipes*, n. s.; *Cyrtophium* (?) *hystrix*, n. s. In the Australian Catalogue, 1882, *Talitrus affinis* is given, apparently by mistake, for *Talitrus assimilis*, and in 1885, Mr Haswell makes *Talitrus affinis* a synonym of *Talitrus sylvaticus*, Haswell. *Cyrtophium* (?) *hystrix* he subsequently named "*Læmatophilus hystrix*."

The new genus *Aspidophoreia* is thus defined:—"Coxæ of the posterior gnathopoda and of the first and second pairs of pereiopoda greatly expanded, deeper than the respective segments those of the three last pairs of pereiopoda small, that of the third pair bilobed—the posterior lobe larger than the anterior. Antennæ simple; the superior pair shorter than the inferior Mandibles without an appendage. Maxillipedes with a pointed dactylos. Gnathopoda subchelate—the posterior pair much larger than the anterior. Posterior pleopoda uniramous

—the ramus uniarticulate. Telson squamiform, cleft to the base." Mr. Haswell adds the remark that in most of its characters this genus "approaches *Allorchestes*—being distinguished from that genus only by the largely developed anterior coxæ and the character of the telson." For his subsequent view of the position of this genus, see Note on Haswell, 1885.

1880. Joseph, Gustav.

Ueber *Niphargus puteanus* aus Venedig. Bericht d. naturw. Sektion d. Schlesisch. Gesellschaft für vaterland. Cultur. 1879/80. pp. 35 etc. 1880.

See Note on Joseph, 1879.

1880. Jourdain, S.

Sur les cylindres sensoriels de l'antenne interne des Crustacés. Comptes rendus. Vol. 91. Paris. 1880. pp. 1091–1093.

M. Jourdain concludes that the cylindres à bâtonnets so commonly met with on the upper antennæ (antenne interne) of Crustacea, both podophthalmic and oligognath, are certainly organs of sense; but, relying only on anatomical structure apart from physiological experiment, we have no right to affirm that these cylinders "sont affectés à l'olfaction."

1880. Kossmann, Robby, born November 22, 1849 (P. Mayer).

Zoologische Ergebnisse einer im Auftrage der königlichen Academie der Wissenschaften zu Berlin ausgeführten Reise in die Küstengebiete des rothen Meeres. Herausgegeben mit Unterstützung der königlichen Academie von Robby Kossmann. Zweite Hälfte, Erste Lieferung. Leipzig, 1880.

In the order Læmodipoda, pages 126–128, Kossmann describes "*Protella Danæ*," n. s., Taf. xii. Fig. 1–7, and *Protella subspinosa*, n. s., Taf. xii. Fig. 8, 9. Both of these are considered by Mayer to be young forms of *Protella phasma*, Montagu.

In the order Amphipoda, pages 129–140, he first of all observes that he cannot acquiesce in that accentuation of small, and generally merely sexual, distinctions in the form of the gnathopods, which has led to the separation of the genera *Talitrus*, *Orchestia*, *Orchestoidea* and *Talorchestia*. He prefers to group in the genus *Orchestia* all forms of the family with short upper antennæ and without ungues on the maxillipeds. He then describes *Orchestia fissispinosa*, n. s., Taf. xiii. Fig. 1–5, from a form probably female, in which the first gnathopod is not in the least cheliform, the second gnathopod has a dactylus which ends in a pointed spine, and also has fine spinules on the whole inner rim, while the rest of the rim is quite bare. The figure shows a hand, terminally rounded, projecting much beyond the dactylus.

It must here be observed that, if the four genera above-named are united, *Talitrus* takes precedence of *Orchestia*, and, in fact, if they are kept separate, *Orchestia* is the only one of the four in which Kossmann's species cannot stand. Provisionally it may be called *Talitrus fissispinosus*, but the possibility remains that a single specimen 5 mm. in length may be the young of some previously known species.

Professor Kossmann uses the term *first pereiopod* as an alternative for *first gnathopod*, thus adding one more to the many confusions in the nomenclature of our subject. It is surely of the first importance in scientific language that as far as possible one word should be restricted to one meaning. Since the inventor of the term *first pereiopod* applied it to the limb behind the *second gnathopod*, it is open to other naturalists to reject the term altogether as inconvenient or erroneous, but not to apply it to the limb in front of the second gnathopod. For other confusions in nomenclature see the Note on Wrześniowski, 1881.

In the family Gammaridæ, to the genus *Œdicerus*, Kroyer, Kossmann assigns the synonyms *Westwoodilla*, Spence Bate; *Monoculodes*, Stimpson; *Kroyera*, Spence Bate. To show the close connection of the four he gives the following table:—

"Zweiter Gnathopode:

"A. scheerenförmig	Kroyera, Spence Bate.
"B. subcheliform, Carpus	
a. bis gegen den Dactylus verlängert . .	Monoculodes, Spence Bate.
b. nicht bis gegen den Dactylus verlängert . .	Œdicerus, Kroyer.
"C. weder subcheliform, noch scheerenförmig . .	Westwoodilla, Spence Bate."

The other distinctions, he says, depend only on the proximity or separation of the eyes. For *Œdicerus* he offers the following diagnosis:—

"Kopf in ein spitzes, abwärts gebogenes Rostrum ausgezogen. Vorderantennen ohne Nebenast. Mandibel mit dreigliedrigem Taster. Maxillarfüsse mit starker Endklaue. Letzter Pereiopode ausserordentlich verlängert, mit griffelförmigem Endgliede. Hintere Pleopoden sämmtlich zweiästig, die Aeste ganz oder fast völlig nackt. Telson einfach."

He describes *Œdicerus æquimanus*, n. s., Taf. xiii. Fig. 6–8, in which, he says, the eyes appear to be separate; the pigment was no longer visible, but there were two lateral facetted corneæ to be seen.

Leucothoë crassimana, n. s., Taf. xiii. Fig. 9–10, is probably, as suggested by Miers in his "Alert" Report, 1884, a synonym of *Leucothoë spinicarpa*, Abildgaard. Kossmann's largest specimen was a female with eggs, 7 mm. in length. Under *Maera* (properly *Mæra*), he describes *Maera erythræa*, n. s., Taf. xiv. Fig. 1–8, which he says is very like Dana's *Gammarus brasiliensis*. That species, he thinks, Sp. Bate ought to have placed in the genus *Mæra*, not in *Gammarella*. It may indeed be noted that the description of the antennæ does not agree with Sp. Bate's own definition of *Gammarella*. Meantime Kossmann's species does not well agree with *Mæra*, but suits very fairly with *Elasmopus*, Costa, as defined by Boeck, both in respect of the mandibles, antennæ, uropods and telson. It may well stand at present as *Elasmopus erythræus*.

Mæra massavensis, n. s., Taf. xiv. Fig. 9–11, is described as belonging "to that subdivision of the genus *Maera* of which *M. tenella*, Dana, is typical. It would perhaps not be impossible to characterise it as a new genus. Apart from the slenderer habit, its characters are the presence of a double claw on the pereiopods (see Dana, Expl. Exp. Crust., Atl., pl. 65, fig. 7*d*) and the peculiarity, that the second joint of the upper antennæ is much longer and thinner than the preceding." It is perhaps by some oversight that Kossmann describes "the hinder pleopoda" as quite like those of the preceding species, although with less numerous, finer spines. This is, with little doubt, a species of *Mæra*, and in that genus the last uropods have long rami projecting beyond the first and second pairs.

In the family Podoceridæ he mentions *Amphithoë filosa?*, Savigny's species, and *Amphithoë erythræa*, n. s., Taf. xiv. Fig. 12, 13, with the "general form quite as in *Amphithoë filicornis*, Dana; stellate pigment distributed over the whole body." I do not think this species can be separated from "*Amphithoë Vaillantii*," Lucas, 1849.

Under *Amphithoïdes*, new genus, Kossmann remarks that "Claus says in his Lehrbuch, (3rd Edition, p. 515) of the genus *Amphithoë*: 'die vordern (Antennen) meist ohne

Nebenast,' while Dana says expressly 'Antennæ primæ non appendiculatæ,' and Spence Bate does not attribute an accessory flagellum to a single one of his 39 species of Amphithoë." (Compare Note on Huxley, 1877.) Kossmann having found a form, in other respects near to *Amphithoë*, but with an accessory flagellum, not without show of reason institutes a new genus for it, which he regards as a link between *Gammarus* and *Amphithoë*. The *Podocerus longicornis*, Heller, and *Podocerus larginianus*, Heller, 1867, which Nebeski, 1880, transfers to *Amphithoë*, although they have an accessory flagellum, should perhaps rather be placed in Kossmann's genus *Amphithoïdes*, unless that itself should yield to *Grubia*, Czerniavski, 1868.

The new genus is thus defined :—"Schaft der obern Antenne kürzer, als der der untern, trägt eine Nebengeissel. Gnathopoden ungefahr gleich gross (♀?). Epimeren wie bei *Amphithoë*. Aussenast der letzten Pleopoden mit nur einem ausgebildeten Haken versehen. Telson einfach, flach, ohne Bewaffnung. Breite Brutblatter."

The type-species, *Amphithoïdes longicornis*, n. s., is not figured. The upper antennæ are as long as the animal. The second joint of the peduncle is more slender and somewhat longer than the first; the third much shorter. The principal flagellum consists of twenty-two (with the terminal rudiment twenty-three) joints distally increasing in length; the accessory flagellum, consisting of one long and one short joint, does not attain the length of the first joint of the principal flagellum. The mouth-organs answer to Dana's figures for *Amphithoë*. Other particulars are given, but it is a great disadvantage that the establishment of a new genus should be unattended by illustrative figures. The specimens did not exceed a length of 4 mm. In the two-jointed accessory flagellum and the last uropods this species agrees with *Podocerus monodon*, Heller, 1866, but the principal flagellum of the upper antennæ is quite distinct.

In the family Corophiidæ, he notes that *Colomastix*, Grube, is earlier than either *Erampua*, Norman, or *Cratippus*, Spence Bate. He describes *Colomastix hamifer*, n. s., Taf. xv. Fig. 1–10, which seems to be separated by very fine distinctions from *Colomastix pusilla*, Grube, as *Cratippus tenuipes*, Sp. Bate, by equally subtle differences from Grube's species. In *Colomastix hamifer* the second gnathopod, however, is described as having the second, third and fourth joints very short; this probably indicates that the specimen was a male form.

In the tribe Hyperina, family Synopiadæ, Kossmann describes *Synopia orientalis*, n. s., Taf. xv. Fig. 11–13. Only the first peræopod, part of the second, and the maxillipeds, are figured. In many respects the species is stated to agree with Dana's *Synopia ultramarina*. The mouth-organs obviously remove this genus, as has been pointed out by Claus, from the Hyperina.

1880. Markham, Albert Hastings.

The great frozen sea. A personal narrative of the voyage of the "Alert" during the Arctic Expedition of 1875–6. Fourth Edition. London, 1880.

On the 11th of May, 1876, within about 400 miles of the North Pole, in a depth of 71 fathoms, "a bread bag, filled with the scrapings of our pannikins and a little pemmican, was lowered to the bottom, and, having been kept there some hours, was hauled up, and to our great joy was found to be almost alive with numerous small crustaceans and foraminifera; specimens of which were, of course, collected and preserved, being the most northern animal life yet discovered." A footnote to the word "crustaceans" says, "*Anonyx nugax*, a fine adult male example, and several smaller ones. The length of the largest specimen is 1½ inch. This species is one of the commonest and most abundantly distributed of the northern

Amphipoda. It was discovered by Captain Phipps in 1773, and is found along the shores of Arctic America, in the White Sea, on the coasts of Greenland, Iceland, Spitzbergen, Norway, and in the Sea of Okhotsk" (p. 309). On the following day Captain Markham with his party, by a walk of about a mile, reached latitude 83° 20′ 26″ N., 399½ miles from the North Pole.

1880. MARTENS, EDUARD VON.

Crustacea. The Zoological Record for 1878: being Volume fifteenth of the Record of Zoological Literature. London, M.DCCC.LXXX. pp. 1–47.

1880. MAYER, PAUL.

Arthrostraca, in Zoologischer Jahresbericht für 1879. Herausgegeben von der zoologischer Station zu Neapel. Redigirt von Prof. J. Vict. Carus. Leipzig, 1880. pp. 415–426.

1880. MIERS, E. J.

Crustacea collected by E. Whymper, Esq., chiefly in the North Greenland Seas. Journ. Linn. Soc., Zoology. XV. (1880), pp. 59–73.

No new Amphipoda are reported.

1880. NEBESKI, OTMAR.

Beiträge zur Kenntniss der Amphipoden der Adria. Arb. zool. Inst. Wien, Bd. III. 52 pp. Mit 4 Tafeln. Also separately, Wien, 1880.

The first section is on the unicellular glands in the first and second peræopods of the Corophiidæ. Counting seven joints to the leg, the gland-cells are found as a rule in the second, third, fourth and fifth joints. Each single element of the gland presents itself as one cell, with a special cuticular duct, hence the epithet chosen. There are two kinds of cells, the opaque and the clear, the former found only in the second joint, the latter both in this and the three following.

In the unguis there is a little reservoir into which the ducts of the glandular apparatus open to let out the house-building secretion at the point of the finger. The form of the glandular complex varies, but for the same species, or even genus, is constant. Nebeski found the secretory apparatus in *all* Corophiidæ which he was able to examine; "these were species of the genera *Microdeutopus*, *Microprotopus*, *Amphithoë*, *Podocerus*, *Cerapus* and *Corophium*. The genus *Cyrtophium*, which hitherto has been included among the Corophiidæ, but which is devoid of the glands and so appears to be an exception, differs in many respects essentially from the Corophiidæ, and on the other hand stands so near to the Dulichiidæ that it ought to be reckoned in this family, and so the exception is only apparent." In *Orchestia* the arrangement is different; in the Gammaridæ, he says, the glands are, so far as he knows, entirely wanting. He considers that the possession of the secretory apparatus in the first and second peræopods may be regarded as the characteristic mark of the Corophiidæ. "It has been long known," he says, "that species of the genera *Cerapus*, *Siphonocætes* and *Unciola*, Say (= *Microdeutopus*, Costa) through cementing sand, mud, particles of wood, etc., by means of a secretion hardening in water, form tubes into which they withdraw

when disturbed." He refers to the method, mentioned by Sp. Bate, adopted by species of *Amphithoë* of wrapping themselves about with sea-weed. This he observed in the case of *Amphithoë penicillata*, Costa, and also in Heller's two species of *Podocerus*, which he names *Amphithoë longicornis* and *Amphithoë largimana*. (See Note on Kossmann, 1880.) The Corophiinæ adopt a third mode of using their secretion, in lining the walls of the channels which they burrow in the mud.

The second section treats of the unicellular glands in the genus *Orchestia*. Here the gland-cells are distributed in different places over the whole body, but principally "in the coxal-plates and the analogously formed lamellar expansions which are found on the basos of the three hinder peræopods of both sexes and on that of the second pair of gnathopods of the female." Small groups are found in the other joints of the legs, and in small numbers the cells are found in the antennæ, mandibles, maxillipeds, last uropods, and elsewhere; in the last pleon-segment they form a large dorsal complex, reaching into the telson. The outlets are not as in the Corophiidæ by numerous tubes of various lengths, often uniting into a bundle before reaching the common exit, but by short courses to independent pores opening in the chitinous walls of various parts of the body. They are found in both sexes of *Orchestia*, of terrestrial habit, but in *Nicea*, more attached to the water, they are wanting, and may hence have the function of preventing too rapid exhalation of moisture.

Comparing his own observations with those of others, Nebeski concludes "that in the *Phronimidæ* and *Caprellidæ* three to five or more gland-cells are united in the formation of a secretory element and from this proceeds a cuticular emission-duct, while in the Crevettina this formation of a complex does not occur, inasmuch as the secretory element coincides with the histological, that is with the cell, and so a special cuticular passage belongs to each cell. The *Hyperidæ* seem to possess both types of glands, so that in this respect they occupy an intermediate position; at least Paul Mayer mentions that in these Amphipoda 'in opposition to the Phronimidæ the complex-formation only occurs in a limited degree or is entirely wanting,' which would consequently betoken a nearer approach to the Crevettina."

The section on the renal glands attached to the intestine of the Crevettina is of considerable interest. Nebeski cannot confirm Spence Bate's view that in *Gammarus* and *Mæra* there is but one gland-tube, at least he himself always found two in *Gammarus marinus* and *Gammarus locusta* as well as in *Mæra brevicaudata*, and with this the statements of Wrześniowski on *Gammarus pulex* agree, although in *Goplana polonica* the right gland suffers degradation in course of development. In *Melita* Nebeski found the gland unpaired. In all the Corophiidæ, he says, we have two small tubular or vesicular structures which rise obliquely from the intestine. Among the Gammaridæ they are small in *Mæra*, but in most they stretch in adult specimens through more than three segments. For these the peculiarity is characteristic, that at their origin they bend forwards, and, lying close to the intestine, run forwards more or less far. In *Cyrtophium* they pass backwards through the long fourth, to the beginning of the fifth, pleon-segment. In *Nicea* to begin with they turn backwards, but again bend forwards and end just over the place of origin. In *Orchestia* they differ both in size and position. While in all other forms, where the rectum quite uniformly occupies the three last pleon-segments, the tubes are placed on the intestine at the boundary between the third and fourth pleon-segments, in *Orchestia* they arise in the seventh peræon-segment at the sides of the intestinal canal, and with gradual elevation run backwards; between the third and fourth pleon-segments they lie dorsally on the intestine and here form the same flexure which *Nicea* exhibits. The difference between *Nicea* and *Orchestia* is shown to depend on the modification which the rectum has undergone in *Orchestia*. That the glands belong to the mid-gut is a point on which Nebeski is in agreement with Mayer, 1882, and Baldwin

Spencer, 1885. In regard to the concretions found in the gland-tubes of *Orchestia* he is also corroborated by Spencer, who found such in *Talitrus locusta*, though apparently of a somewhat different chemical composition.

A section is devoted to the rectum of *Orchestia*, and another to a comparison of its branchiæ with those of other Crevettina. A further section discusses the production of ova in the testes of *Orchestia*. The curious fact is affirmed that the males of *Orchestia* produce, not, as the Cymothoidæ, at one time spermatozoa and at another time ova, but both sexual products in parallel development at one and the same time, although the eggs are never laid, and there is no brood-pouch for hatching them if they were.

In the section headed "Beobachtungen über die *Crevettinen*fauna des Triester Hafens," under *Orchestia carimana*, Heller, Nebeski remarks that this, which was originally regarded by Heller as a fresh-water form, must really be considered, like *Talitrus*, a land-Amphipod, since it soon dies whether placed in fresh or salt water.

In the Gammaridæ, subfamily Stegocephalinæ, Nebeski gives *Probolium tergestinum*, n. s. (fig. 39), "Artcharaktere: 3. Glied der Maxillarfüsse bedeutend verlängert. 6. Glied des ersten Fusspaares länglich viereckig, vorne abgestutzt, 4. und 5. Glied vorne in nach unten vorspringende Lappen ausgezogen." It is said to be very near *Probolium monoculoides*, nor am I inclined to separate it from that species (*Stenothoë monoculoides*, Montagu), even as a variety. The figures given by Nebeski seem to me to agree with those given by Boeck with even more than the usual exactness to be found between authors figuring quite independently of one another.

In the subfamily Gammarinæ, under *Dexamine*, Leach, he notices the large comparative size of the first three pleon-segments as well in this genus as in *Atylus*, *Pherusa* and *Calliope*, giving room for powerful muscles to work the relatively large pleopoda of these capital swimmers. He gives *Dexamine dolichonyx*, n. s. (fig. 40), "Artcharaktere: 1. Glied der oberen Antennen kurz und gedrungen, ohne Zahnfortsatz; das breite Handglied des zweiten Gnathopodenpaares beim Männchen am Oberrande tief ausgebuchtet: Klauen der Thoracalbeine sehr lang; das 2., 3. und 4. Segment des Abdomens am dorsalen Hinterrande in einem spitzen Zahn ausgezogen." The deep narrow cavity in the back of the hand of the second gnathopod was only found in the two male specimens, not in the females. A specimen of this curious species, from the Clyde, sent me by Mr. David Robertson, of Glasgow, shows in the peræopods a short hand and wrist preceded by a very long joint, which is characteristic of Boeck's genus *Tritæta*. The species should, I think, be named *Tritæta dolichonyx*. The branchiæ have lateral dilatations.

Nebeski gives "*Pherusa bispinosa* (= *Atylus bispinosus* Sp. B.)," with the remark that "this species, as long as the artificial separation of the genera *Pherusa* and *Atylus* is maintained, must be referred to *Pherusa*, as it possesses a completely lanceolate telson, which is precisely the character that differentiates *Pherusa* from *Atylus*." He seems unaware that Boeck has already named it *Haliragis bispinosus*.

"*Gammarus Edwardsi*," Sp. Bate, is considered by Nebeski as undoubtedly not more than a variety of *Gammarus locusta*.

In the Corophiidæ, subfamily Podocerinæ, he discusses the connection of the telson and the last uropods with the mode of life. He thinks that *Aora* and *Stimpsonia* will probably have to be transferred to the Podocerinæ, in which Heller has already placed *Microdeutopus*. (It is, indeed, quite certain that those three genera cannot stand in different subfamilies.) Very near to *Amphithoë penicillata*, Costa, which is among the commonest Amphipods of Trieste Harbour, he places *Amphithoë longicornis* and *Amphithoë largimana*, placed by Heller in the genus *Podocerus* because of the uniarticulate secondary flagellum, although in other respects, Nebeski says, they clearly belong to *Amphithoë*. The four so called species of *Podocerus*, named *variegatus*, *pelagicus*, *pulchellus* and *falcatus*, he unites into one

species, the females, and especially the younger specimens, agreeing with *Podocerus pelagicus*, Sp. Bate, the adult females having often the *variegatus* form; the males being either of the *pulchellus* or *falcatus* form. Boeck and Hoek, he thinks, were wrong in regarding these two latter as stages of growth, for they attain an equal size, and series of the two forms do not seem adapted for passing one into the other. *Podocerus ocius*, Sp. Bate, he regards as quite distinct.

To *Cerapus abditus*, Templeton, he assigns *Dercothoë punctata*, M.-Edw., as the female, but without giving reasons.

In *Cyrtophium* he points out that the 1–2-articulate accessory flagellum has been overlooked. He considers that the genus should be transferred from the Corophiidæ to the Dulichiidæ. The species *Cyrtophium darwinii*, Spence Bate, to which Nebeski is referring, ought no doubt to be placed in Dana's genus *Platophium*, which Dana himself distinguished from *Cyrtophium* by the presence of an accessory flagellum.

Pages 47–48 contain the list of "Literatur." Fig. 41 refers to *Microdeutopus gryllotalpa*, Costa; Fig. 42 gives the telson of *Podocerus falcatus*, *Amphithoë longicornis*, *Amphithoë largimana*, *Amphithoë penicillata*, *Microdentopus*, *Amphithoë bicuspis*, *Microprotopus*. Fig. 42 refers to *Podocerus falcatus*; Fig. 43 to *Podocerus ocius*. The earlier figures illustrate the anatomical details given in this important paper.

1880. NICHOLSON, HENRY ALLEYNE.

A Manual of Zoology for the use of students with a general introduction on the principles of zoology. Sixth Edition, revised and enlarged. Edinburgh and London, MDCCCLXXX.

In the Arthropoda, Class I. Crustacea, has in this work, p. 302, Subclass IV. [III., see p. 283], Malacostraca (*Thoracipoda*, Woodward), in which Division A. Edriophthalmata, is split up into three orders, Læmodipoda, Amphipoda, Isopoda. In the definition of the Læmodipoda, they have "*The first two segments of the thorax amalgamated with the head and carrying legs*," which is no doubt a theoretically accurate description, if the maxillipeds are regarded as legs, but in the account which follows the statement is retained from earlier editions that "the first thoracic segment is amalgamated with the head, and the limbs of this segment appear to be inserted beneath the head, or, as it were, beneath the throat; hence the name given to the order." Here the first thoracic segment is the second thoracic segment of the definition. The mandibles are stated to be without palps, which is not the case in all, or even most, genera of this order. A figure is given of "*Caprella phasma*," which belongs to a genus possessing mandibular-palps. The species is known as *Protella phasma*, Montagu, and has rudimentary peræopods, which are not indicated in the figure.

The second order, Amphipoda, is exemplified by *Talitrus locusta*, which is figured, and *Gammarus pulex*. It is remarked that "all the Amphipoda are small," a rather indefinite statement, scarcely indicating the actual range from about a tenth of an inch to something over four inches.

The statement that "the earliest known Isopod is the *Prosoponiscus* of the Permian rocks" is a mistake obviously due to the misleading name *Prosoponiscus*, which is as unsuited as its predecessor *Palæocrangon* for a genus of fossil Amphipods.

1880? Parona.

Atti della Società Italiana di Scienze naturali (Modena). XXIII. pp. 42–50.

"*Niphargus putcanus* (Koch). Variety from a cavern in Monte Fenere Val Sesia, Piedmont; with historical account of that species generally." (Dr. von Martens, Zool. Record for 1880.)

1880. Smith, Sidney I.

On the Amphipodus genera, Cerapus, Unciola, and Lepidactylis, described by Thomas Say. The Transactions of the Connecticut Academy, Vol. IV., July, 1880. pp. 268–284. Pl. II*a*.

Professor Smith gives a full description of *Cerapus tubularis*, Say, which he partially figures. It is, he thinks, "not congeneric with any described species, and the genus cannot properly be placed in any of the numerous subfamilies defined by Boeck, though it is probably most nearly allied to his Podocerinæ." He proposes for it a new subfamily, Cerapinæ, thus described:—

"The single known genus differs from the Podocerinæ and allied groups in the following characters. There are only three pairs of branchial lamellæ, which are borne on the third, fourth and fifth segments of the peræon, and only three pairs of ovigerous lamellæ, which are borne on the second, third and fourth segments. The second and third pleopods are much smaller than the first, and their inner lamellæ are rudimentary or very small. The second and third uropods are uniramus and nearly alike, the distal segment in each being short and terminating in a hooked point.

"The only known species inhabits unattached, portable tubes, and, as in many allied genera, has large cement glands in the bases of the first and second peræopods."

Professor Smith at this date regards *Cerapus tubularis* as the only species, without, however, taking *Cerapus abditus*, Templeton, into account. For other species that had been referred to *Cerapus*, he adopts *Erichthonius*, M.-Edw.

Unciola irrorata, Say, is stated to have precedence over *Glauconome leucopis*, Kröyer. *Lepidactylis*, Say, is preferred to the other names which compete for the designation of Slabber's *Oniscus arenarius*.

1880. Stossich, Michele.

Prospetto della Fauna del mare Adriatico. Parte 3. Bolletino della Società adriatica di scienze naturali in Trieste. Vol. 6. 1880.

This paper, included in P. Mayer's list, 1882, I have not been able to obtain.

1880. Stuxberg, Anton.

Evertebratfaunan i Sibiriens Ishaf. Förelöpande Studier grundade på de zoologiska undersökningarna under Prof. A. E. Nordenskiölds Ishafs-expedition

1878–79. Meddeladt den 12 November 1879. Bihang till K. Svenska Vet. Akad. Handlingar. Band 5. N:o 22. Stockholm, 1880. pp. 1–76.

At pages 62–66 Stuxberg enumerates one hundred and fifteen Arctic Amphipoda, which are met with in various localities in the numbers and proportions exhibited by the following table:—

"1) Grönland			74 arter	= 64,3 %
2) Spetsbergen			73 „	= 63,5 %
3) Skandinaviens N. och V. kust			69 „	= 60,0 %
4) Sibiriens Ishaf			60 „	= 52,2 %
5) Murmanska och Hvita hafvet, Jugor schar			31 „	= 26,9 %
6) Matotschkin schar			30 „	= 26,1 %
7) Arktiska Amerika			25 „	= 21,3 %
8) Britannien			24 „	= 20,9 %
9) Island			23 „	= 20,0 %
10) Danmark			22 „	= 19,1 %
deraf *a*) Skagerrak och Kattegat		15		
b) Öfriga danska sund		20		
c) Danmarks vestkust		11		
11) Östersjön			4 „	= 3,5 %."

In the list are named 17. *Anonyx bidentatus*, Stuxberg, n. sp.; 18. *Onesimus zebra*, Stuxberg, n. sp.; 19. *Onesimus rorax*, Stuxberg, n. sp.; 23. *Onesimus abyssicola*, Stuxberg, n. sp.; 30. *Pontoporeia setosa*, Stuxberg, n. sp.; 37. *Pertumnus glacialis*, Stuxberg, n. sp.; 48. *Acercpsis*, n. gen. et n. sp.; 61. *Halirhages maculatus*, Stuxberg, n. sp.; 67. *Gammarus erythropus*, Stuxberg, n. sp.; 71. *Melita*, n. sp. (dentatæ affinis); 72. *Melita diadema*, Stuxberg, n. sp.; 74. *Weyprechtia mirabilis*, Stuxberg, n. sp.; 80. *Stegocephalus kessleri*, Stuxberg, n. sp.; 83. *Metopa gigas*, Stuxberg, n. sp.; 97. *Ampelisca picta*, Stuxberg, n. sp.; 100. *Haploops lineata*, Stuxberg, n. sp.; 111. *Paradulichia* sp. The different stations at which these were severally found are detailed, and as characteristic forms of the Siberian glacial sea, *Atylus carinatus*, Fabr., and "*Acanthostephia Malmgreni*," Goës, receive much attention. Otherwise descriptions are confined to the following, at pages 27–28:—

"Weyprechtia. Novum genus Amphipodum, ex familia Gammarinorum Boeck, inter congeneres valde insigne est et ab iis bene diversum, neque cum aliis ejusdem familiæ generibus similitudinem præbet quam cum genere Amathillarum.

"Weyprechtia mirabilis n. sp. Corporis forma robusta, obesa; *cephalocormus* rotundatus, non *carinatus*, eadem ferme latitudine ac altitudine; *cauda* compressa, altitudine duplo majore quam latitudine. *Antennæ superiores* inferioribus tertia parte breviores: *flagello primario* duplo longiore quam pedunculo, 30–32 articulis composito; *flagello accessorio* prope duplo breviore quam pedunculo, 6–7 articulis composito. *Antennæ inferiores* flagello duplo longiore quam pedunculo, 50–59 articulis composito. Caput rostro brevissimo, longitudine paullo minore quam latitudine (= 4:4,5). *Oculi* reniformes, nigri, nitidi. Epimera 1:mum–4:tum duplo altiora quam latiora; 1:mum angulo inferiore acuminato, 2:dum et 3:tium truncato-rotundato; 5:tum et 6:tum latiora quam altiora, margine inferiore inciso. *Epimeri 4:ti margo posticus supra et infra valde incisus, in medio cornu magno, valido, acuto, transverso, deorsum curvato prædituς, angulus infero-posticus subacutus,—ita ut margo posticus bicornis esse videatur. Caudæ segmenta* 1:mum et 2:dum epimeris angulo postico acutis; 3:tium bidentatum, dentibus subacutis et sursum productis: 4:tum depressione transversa selliformi haud profunda. *Pedes spurii* biramei, ramis longitudine subæqualibus, lanceolatis, marginibus serratis et setigeris. *Appendix caudalis* tertia parte longior quam

latior; supra finem pedunculi pedum ultimi paris spuriorum porrecta, sursum paullo curvata, non fissa, margine postico 3 sinibus haud profundis, quorum medius latus, laterales arcti, setis singulis præditi. *Integumenta* cephalocormi et caudæ nitida, punctis impressis rotundis confertissime collatis.—*Corporis longitudo* 51^{mm}, *latitudo* maxima 17,5^{mm}, *altitudo* maxima 11^{mm}. *Longitudo antennarum superiorum a*) pedunculi 5^{mm}, *b*) flagelli primarii 10^{mm}, *c*) flagelli accessorii 3,3^{mm}. *Longitudo antennarum inferiorum a*) pedunculi 7,5^{mm}, *b*) flagelli accessorii 17^{mm}.

"*Habitat* in Mari Sibiriæ Glaciali inter promontorium Vankarema et Fretum Beringianum fundo arenoso, orgyarum 4–6 profunditate."

No doubt the word "accessorii" is applied to the flagellum of the lower antennæ in the above account by an accidental mistake in writing.

1880. THOMSON, GEORGE M.

New Species of Crustacea from New Zealand. The Annals and Magazine of Natural History. No. 31. July 1880. Vol. VI. Fifth Series. London, 1880. pp. 1–6.

The observations refer to the Crustacean fauna of Dunedin Harbour, the maximum depth of the bay being probably about 6 fathoms. Under "Amphipoda Normalia. Fam. Gammaridæ. Subfam. *Stegocephalides*.," there is instituted the new genus *Panoplæa*, thus defined:—

"Coxæ of the four anterior segments well developed, those of the second pair of pereiopoda excavated on the upper part of the posterior margin. Antennæ subequal, without a secondary appendage. Mandibles with an appendage. Maxillipeds with a squamiform process on the ischium. Gnathopoda feeble, almost chelate. Three posterior pairs of pleopoda double-branched. Telson simple, squamiform." Mr. Thomson says, "I have formed this genus to include two species which appear to me to be the southern representatives of the arctic genus *Pleustes*. It differs from *Pleustes* only in the well-developed squamiform plate on the ischium of the maxillipeds, and in the gnathopoda being slender and more or less chelate. In the general appearance of the species, however, there is a very perceptible difference." The new species, figured Pl. I. figs. 2, 3, are named *Panoplæa spinosa* and *Panoplæa debilis*. Of these, through the kindness of Mr. Thomson, I have been able to examine specimens, and it appears to me that *Panoplæa spinosa* is certainly an *Iphimedia*, while *Panoplæa debilis* has numerous points of resemblance to *Amphithopsis longimana*, Boeck, but as the species has three dorsal spines, it may be more correct to place it in the closely allied genus *Halirages*, Boeck. It cannot be generically united with *Panoplæa* (*Iphimedia*) *spinosa*. In "Subfam. *Phoxides*. Genus Amphilochus, C. Spence Bate," is described "*Amphilochus squamosus*, n. sp. (Pl. I. fig. 4.)." In "Subfam. *Gammarides*. Genus Eusirus, Kröyer.," is described "*Eusirus cuspidatus*, Kröyer, var. *antarcticus*, n. var." Of "*Melita tenuicornis*, Dana (*Maera tenuicornis*, Sp. Bate, *Paramæra tenuicornis*, Miers)," it is said, "the females are remarkable for possessing a hook-like process on the coxal lamellæ of the fourth pair of pereiopoda, almost exactly similar to that figured and described by Fr. Müller (Facts for Darwin, p. 27) as occurring in *M. insatiabilis*." In "Genus Megamœra, Spence Bate," "*Megamœra fasciculata*, n. sp. (Pl. I. fig. 5), is described. In "Fam. Corophiidæ. Genus Corophium, Latr." a description is given of *Corophium contractum*, Stimpson.

1880. Ulianin, B.

Untersuchungen über Blastoderm- und Keimblätterbildung bei *Orchestia Montagui* und *Mediterranea*. Zoologischer Anzeiger. III. pp. 163–165. 1880. (Verhandl. d. zoolog. sect. d. VI. Versamml. russisch. Naturf. u. Aerzte.)

The results of the investigation are here given in summary. There is a notice of this paper by P. Mayer in Zoolog. Jahresber. (1880), II. Abt., pp. 53, 54. 1880. An account of the investigation was published in extenso in 1881. See Note on Ulianin under that date.

1880? Weber, Max.

Über den Bau und die Thätigkeit der sogenannten Leber der Crustaceen. Archiv für mikroskopische Anatomie. XVII. Bonn, 1880? pp. 385–457. Pls. XXXVI–XXXVIII.

"M. Weber has examined histologically and chemically, and described the so-called liver of terrestrial, freshwater, subterraneous, littoral, and truly marine species of different orders, viz.:—several *Oniscidæ*, including the blind *Typhlomiscus steini*, *Asellus aquaticus*, and the subterraneous *A. cavaticus*, *Gammarus pulex*, *fluviatilis*, *puteanus*, *marinus*, and *locusta*, *Talitrus* and *Orchestia*, and *Astacus fluviatilis*. He comes to the conclusion that in the *Decapoda*, *Amphipoda*, and *Isopoda*, this gland is tubular and contains at least two sorts of cells, one of which secretes a fluid acting as a ferment (enzyme) on albuminous substances, and the other a pigment allied with a fatty substance and cholestearin, serving for the emulsion for fat. He calls the first ferment-cells, the second liver-cells, and the whole organ 'hepato-pancreas,' as it combines the function of the liver and that of the true digestive glands of the Vertebrates. During the embryonal stage the liver is developed and active in the *Crustacea*, as in the *Vertebrata*, which proves that its function is not only digestion, but also excretion. In some Amphipods and Decapods, there is a third sort of cells, probably reserve-cells, which are destined to supply, if necessary, the others." (Dr. von Martens, Zool. Record for 1880. He says there is an abstract also in the Journal of the Royal Microscopical Society, iii. p. 424.)

1881. Buckley, Arabella B.

Life and her Children. Fifth Thousand. London. 1881.

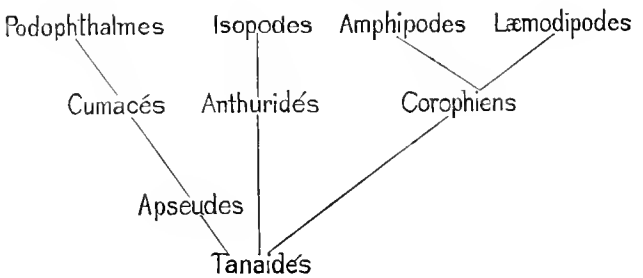
In a popular account of the Crustacea, pp. 153–177, the expression "insects of the sea" for these animals is approved and adopted. The figure, 57. C, to which the name *Caprella* is assigned, really represents *Proto ventricosa*, O. F. Müller.

1881. Delage, Yves.

Contribution à l'étude de l'appareil circulatoire des Crustacés édriophthalmes marins. Paris, 1881. pp. 173. 12 Plates. From Arch. de Zool. Exp. et Gen. Vol. IX. 1881.

This admirably lucid essay discusses the subject successively in regard to the Isopoda, Amphipoda, Læmodipoda, and Tanaidæ. An account is given of the ingenious methods of

investigation employed, a historical review is drawn up of the results obtained or errors committed by previous writers on this branch of research, and after a careful record of Dr. Delage's own observations, a graphic representation is submitted of the affinities between different groups of Crustacea to which those observations seem to point:—



Dr. Delage confirms the view of Fritz Müller that the number of lateral slits in the Amphipodan heart consists, with rare exceptions, of three pairs [without, however, noticing that la Valette had already in 1857 plainly stated this fact in regard to *Gammarus puteanus*, and that Spence Bate, Sessile-eyed Crustacea, vol. i. p. xxxii., 1868, describes the course of the blood in the Amphipoda returning to the heart, "which it enters by three lateral pulsating oblique apertures"]; he gives G. O. Sars the credit of having first clearly indicated the existence of a posterior aorta with definite walls; he finds that Wrześniowski has recognised the existence of the hinder cardio-aortic valve; has described exactly the lower aorta with its termination in the hinder part of the ventral sinus by three openings, two lateral and one terminal; has described the course and branches of the upper aorta, but without seeing the valve that separates it from the heart, or the pericerebral vascular ring; has been the first to recognise that the blood which circulates in the appendages is contained in true vessels, and, lastly, has had a glimpse of the pericardium, since he speaks of a venous cavity above the heart. [In the Zoologischer Anzeiger for 1879 Wrześniowski very minutely describes the valve apparatus at both extremities of the heart.] Delage believes himself to have proved by injections that, in the principal joints of the legs, instead of occupying half the total breadth, leaving the other half to the venous current, the arterial vessels wind, perfectly rounded and defined, between the muscles, only communicating here and there with the corresponding venous vessels, which are also on their part perfectly individualised. He therefore rejects the view that the cavity of each limb is simply subdivided into two compartments by a single longitudinal membrane. His further discoveries concern the existence of the anterior cardio-pericardiac valve [already known to Wrześniowski], a pericardium with perfectly definite and continuous walls, a peri-œsophageal vascular collar formed by two branches of the anterior aorta, and a vascular ring formed by the aorta round the brain, a ring characteristic alike of the Amphipoda and the Læmodipoda. His observations were made principally on *Talitrus locusta*, Latr., *Gammarus locusta*, Fabr., in both of which the lateral orifices of the heart are found in the second, third and fourth segments of the peræon; on *Montagua monoculoides*, Sp. Bate, in which he could not discover an orifice in the second segment; and on *Corophium longicorne*, Latr., in which there is but one pair of lateral orifices, situated in the fourth segment. The Corophinæ are separated from the (other) Amphipoda, not only by this distinction, but also by the absence of two vessels proceeding from the upper extremity of the heart and designated "facial arteries," as well as by the absence of a vascular ring round the so-called "renal organ," and by the circumstances that the lower aorta is not terminally divided, and that the pericardium, instead of occupying the whole length of the body, is limited to the peræon.

In the Caprellina, observations based on *Caprella acanthifera*, Leach, *Caprella acutifrons*, Latr., "*Protella phasma* (Sp. Bate)," "*Proto pedata* (Flemm.) et *P. goodsirii* (Sp. Bate)," show an absence of the peri-œsophageal collar, though the blood-current pertaining to it exists in the usual place. The three pairs of lateral orifices in the heart are present, but the two first pairs are narrow and wanting in activity, especially in *Caprella acutifrons*, thus indicating an affinity between the Caprellina and the Corophinæ, in which the two first pairs of orifices have completely disappeared. They agree with the Corophinæ also in the circumstance that the hind limbs receive their blood from the aorta and return it to the ventral sinus, and do not, as in *Talitrus*, receive it from the ventral sinus and return it to the pericardium.

Of the Tanaidæ Dr. Delage examined more particularly *Paratanais savignyi* (*Tanais savignyi*, Kroyer), in which the heart has two pairs of lateral orifices, situated in the third and fourth segments, *Tanais vittatus*, Lillj., with a single pair in the fourth segment, and *Apseudes latreillii*, Sp. Bate. He thence tabulates the affinities of the Tanaidæ with the Isopods, Amphipods and Decapods respectively. He connects them with the Amphipods by the form and position of the heart; by the absence of arteries springing from the heart with the exception of the aortas; by the small number of arterial ramifications; by the fact that the ventral sinus is arterial and not venous; by the pericardiac vessels; by the loose peri-œsophageal vascular collar not giving origin to a ventral median vessel, and, above all, by the peri-cerebral vascular ring characteristic of the Amphipoda.

For the Hyperina, which he had no opportunity of examining, he refers to Pagenstecher's account of *Phronima sedentaria*, 1861 (on p. 90 misprinted 1761), and various treatises by Claus, who has shown that in the Hyperina the heart has three pairs of lateral orifices besides two aortas with valves, the lower aorta communicating with the heart by a double opening, showing perhaps an indication, Dr. Delage suggests, of a tendency to the bifid arrangement actually found in the Isopods and in the two abdominal aortas of the Tanaidæ.

For the whole subject, compare Note on Wrześniowski, 1879; for the Tanaidæ, Note on Blanc, 1884.

1881. Gordon, G.

Phronima sedentaria and its Beroe. The Scottish Naturalist. A Magazine of Natural History. Edited by F. Buchanan White. Volume VI. Edinburgh and London, 1881–1882. pp. 56–59.

Mr. William Robertson, residing in Shetland, having procured specimens of *Phronima sedentaria* from Urrafirth, and kept them alive for some time in confinement, informed Dr. Gordon "that the tail of the crustacean was the sole moving power that carried both itself and dwelling round the sides of the vessel; that the *Phronima* often left and returned to its *Beroe;* that hundreds of them were cast ashore about the same time, January 1880, at Ronas Voe." Of the young, two or three days after their birth, he says, "these young crustaceans kept to the surface of the water, but if it was stirred, they then sank to the bottom, lay on their backs, and kept constantly working with their tails. The adults lay the same way when they were out of the *Beroes*." The way in which the *Beroe* is spoken of in parts of this paper might easily produce the impression that it was a still living animal, in which the *Phronima* was ensconced.

1881. Hartwig, G.

The Sea and its living wonders, a popular account of the marvels of the deep and of the progress of maritime discovery from the earliest ages to the present time. New Edition. London, 1881.

Among the "Edriophthalmia" he mentions, page 247, "the saltatorial sandhoppers (Talitrus)," "the ill-famed Cheluræ," "the parasitical Cyami which gnaw deep holes into the skin of the whale." Figures are given of *Chelura terebrans* and a "sandhopper," presumably *Talitrus locusta*. The frequency of the sandhoppers on the shores of the Arctic seas is illustrated by Holböll's account of his experiment with bait in an open basket let down to a depth of seventy-five fathoms. It is scarcely necessary to remark that the Amphipods taken in that instance were not the sandhoppers of the shore.

1881. Leslie, George, and Herdman, William A.

The invertebrate Fauna of the Firth of Forth. Part II. comprising the Protozoa, Polyzoa, Crustacea, and Tunicata. From the Proceedings of the Royal Physical Society of Edinburgh, vol. vi., 1881. Edinburgh, 1881.

The Crustacea extend from page 42 to page 52. "In the arrangement and nomenclature of the Amphipoda and Isopoda," the authors say, "we have followed Bate and Westwood's 'British Sessile-eyed Crustacea,' a work from which we have derived the greatest assistance." They enumerate only sixteen species of Amphipoda, without any descriptions. The "*Caprella linearis* (Linn.)," may probably be the same as the "*C. lobata* (Müll.)," which they identify with "the *C. lævis* of Goodsir." This will reduce the number of species to fifteen, of which five are Caprellidæ. It will be tolerably safe to say that such a list gives no idea whatever of the Amphipod-fauna of the Firth of Forth. Six out of the ten species of normal Amphipoda are given on the authority of Metzger.

1881. Martens, Eduard von.

Crustacea. The Zoological Record for 1879; being Volume sixteenth of the Record of Zoological Literature. London, M.DCCC.LXXXI. pp. 1–45.

It is here noted that *Glycera*, Haswell's name for a new genus in the Lysianassinæ, is preoccupied in Annelides.

1881. Martens, Eduard von.

Crustacea. The Zoological Record for 1880; being Volume seventeenth of the Record of Zoological Literature. London, M.DCCC.LXXXI. pp. 1–61.

It is noted that the name *Chloris*, used by Haswell for a new genus among the Gammaridæ, is twice preoccupied in *Aves*, and once in Botany.

1881. Mayer, Paul.

Arthrostraca, in Zoologischer Jahresbericht für 1880. II. Abtheilung. Leipzig, 1881. pp. 51–63.

1881. Meinert, Fr.

Crustacea Isopoda, Amphipoda et Decapoda Daniæ: Fortegnelse over Danmarks Isopode, Amphipode og Decapode Krebsdyr. Naturhistorisk Tidsskrift. III. Raekkes 12 Bind. 3. Heft. pp. 456–512.

Lists are given of species and the localities at which they were taken, and an account from Professor Schiødte of the tubes of *Haploops tubicola*, Lillj., which has small purple-red eyes. No new species of Amphipoda are described in this paper.

1881. Miers, E. J.

Account of the Zoological Collections made during the Survey of H.M.S. "Alert" in the Straits of Magellan and on the Coast of Patagonia. Proc. Zool. Soc. Lond., January 1881.

There is here only an incidental allusion to the Amphipoda.

1881. Miers, E. J.

On a small collection of Crustacea and Pycnogonida from Franz-Josef-Land collected by B. Leigh-Smith, Esq., lat. 79° 55′ N., long. about 51° E., in the "Eira." The Annals and Magazine of Natural History. Ser. 5. Vol. VII. pp. 45–49. Pl. VII. London, 1881.

On *Acanthonotozoma inflatum* (Kröyer), Mr. Miers remarks, "A single female was obtained. This specimen agrees very well with Goës's figure of the species; but the anterior margin of the coxa of the 4th thoracic limb is regularly rounded, whereas in Goës's figure it is represented as somewhat angulated. The dorsal carina, which is described by Boeck as very high (altissima), on the first 3 post-abdominal segments, in Goës's figure and in our specimen is distinct, but not much elevated."

Acanthostepheia pulchra, n. s., is figured and described, with a comparison between it and *Acanthostepheia malmgreni*, Goës. *Amathillopsis affinis*, n. s., is figured and in like manner compared with its near ally *Amathillopsis spinigera*, Heller.

1881. Miers, E. J.

Crustacea, in Markham's Polar Reconnaissance, 1881.

No new Amphipoda reported. Compare Note on Markham, 1880.

1881. Miers, E. J.

On a collection of Crustacea made by Baron Hermann-Maltzan at Goree Island, Senegambia. Annals and Magazine of Natural History, September, October, November, 1881.

The only Amphipod included in this account is *Ampelisca tenuicornis*, Liljeborg, of which a detailed description is given.

1881. Moseley, Henry Nottidge.

Report on certain Hydroid, Alcyonarian and Madreporarian Corals procured during the Voyage of H.M.S. Challenger, in the years 1873–1876. Zool. Chall. Exp., Part vii. London, Edinburgh, Dublin, 1881.

At page 204, Mr. Moseley says that "in nearly all the mesenterial cavities [of *Stephanophyllia formosissima*] were found one or two small crustacea (a Gammarid?), which must apparently live as commensals within the cavities of the living coral." Three specimens of the coral were obtained at "Station 192, off the Ki Islands. Lat. 5° 42′ S., long. 132° 25′ E. 129 fathoms;" and several specimens at "Station 209, off Zebu, Philippine Islands. Lat. 18° 10′ N., long. 123° 55′ E. 95 fathoms."

As I have not found any Gammarids in the Challenger collection from the stations here mentioned, there is little doubt that the Crustacea referred to belonged to the Hyperina.

1881. Packard, A. S., jr.

The Fauna of the Nickajack Cave. By E. D. Cope and A. S. Packard, jr. The American Naturalist, November, 1881. Volume XV. Philadelphia, 1881. pp. 877–882.

"Many miles of galleries have been explored, and no end has yet been reached" of this cave on the southern boundary of Tennessee. The Isopod, *Cecidotæa nickajackensis*, Packard, n. s., is not uncommon in the waters of the cave. "The second crustacean discovered swimming about in the subterranean stream, was a species of Amphipod belonging to the genus Crangonyx, and which may be called *Crangonyx antennatum* Packard." The description of pl. vii. fig. 2, gives *Crangonyx antennatus*. "It is a large and purplish species; the first antennæ very long; the flagellum with 20–24 joints; the entire antenna being over one-half, and nearly two-thirds as long as the body; the last joint of the peduncle being slightly more than half as long as the penultimate joint." A comparison of it is made with *Crangonyx gracilis*, Smith. "It is very different from *C. vitreus* Cope, of Mammoth Cave, and from *C. packardii* Smith, differing in its distinct eyes, and larger, more numerously jointed antennæ."

1881. Smith, Sidney I.

Preliminary notice of the Crustacea dredged, in 64 to 325 fathoms, off the south coast of New England, by the United States Fish Commission in 1880. Proceedings of the National Museum; Washington. Vol. III. for 1880, January, 1881. pp. 413–452.

Among the Amphipoda, pages 447–452, is described "*Neohela phasma*, sp. nov.—*Neohela*, nom. nov., vice *Hela* Boeck, præoc." "This species is apparently very closely allied to *N. monstrosa* Boeck, but has well-developed eyes, and the propodus in the second pair of gnathopods is different in form, besides other slight differences." Altogether seven species of Amphipoda are here recorded.

1881. Smith, S. I.

Recent Dredging by the United-States Fish Commission off the South Coast of New England, with some Notice of the Crustacea obtained. The Annals and Magazine of Natural History. No. 38. February, 1881. London, 1881. pp. 143–146.

"Few species of Amphipoda were found; but the Arctic species, *Stegocephalus ampulla*, *Haploops setosa*, and *Epimeria loricata*, G. O. Sars, occurred, the last in abundance."

1881. Ulianin, B.

Zur Entwicklungsgeschichte der Amphipoden. Zeitschr. f. wissensch. Zool., XXXV. pp. 440–460, Taf. XXIV. 1881.

Abstract in Journ. Roy. Microscop. Soc. [2], 1. pp. 599, 600. August 1881.

After explaining his methods of investigation, Ulianin refers to eight authors, who have previously treated the same subject. Of H. Rathke's Reisebemerkungen aus Taurien, 1837, he says, "Enthält Beobachtungen über Entwicklung der Amphithoë picta, Gammarus gracilis, Amathia carinata und Hyale pontica.—Die Beobachtungen von Rathke haben Bedeutung nur in historischer Hinsicht." Of Meissner's paper in 1885, he says, "Enthält die ersten sehr dürftigen und grösstentheils unrichtigen Angaben über das kugelförmige Organ," and at p. 451, "Nach den von Meissner veröffentlichten Abbildungen zu urtheilen, untersuchte er ein zerstörtes Organ, das an Lappen der zerrissenen Cuticularhaut hing. Die Einstülpung der Cuticula in das kugelförmige Organ wurde von ihm als eine Öffnung in der Cuticula, nämlich als eine Micropylöffnung erklärt. Da er die Membran, in der er eine Mikropylöffnung zu finden glaubte, irrthümlich für die Dotterhaut hielt, so zog er den Schluss, das die Befruchtung des Eies der Amphipoden noch im Eierstocke vor der Bildung des Chorions geschehe." In Müller's Für Darwin, 1864, he says, "Das Vorhandensein der Larvenhaut bei Amphipoden-Embryonen wird zum ersten Male gezeigt." He finds the statements of de la Valette on the first developmental stages in *Gammarus pulex* very like what he has himself observed in the eggs of species of *Orchestia*, but 1. the latter undergo "wenn auch einer sehr oberflächlichen und kurzen doch einer echten Furchung;" 2. "bei den Orchestien . . . treten aus dem Inneren des Eies nur vier grosse amöboide Zellen, die nur nach mehrfacher Theilung und Wanderung auf der Oberfläche des Eies in ruhende Blastodermzellen übergehen; während der Wanderung der amöboiden Zellen auf der Oberfläche des Eies wird ausserdem der Nahrungsdotter wieder einer Art oberflächlicher Segmentation unterworfen;" 3. "bei den Orchestien ist es möglich gleich nach der ersten Theilung der vier grossen aus dem Inneren des Eies ausgetretenen amöboiden Zellen den Pol zu unterscheiden, an welchem das Blastoderm angelegt wird und der später der Bauchfläche des Embryo entsprechen wird."

In Bessels's paper in 1869 and Dohrn's in 1870, Ulianin says, "das kugelförmige Organ wird mit dem Rückenstachel der Zoëa homologisirt," but, he thinks, without good reason. Sars' opinion that the organ in question was of service for the nourishment of the embryo, he considers quite untenable. He himself agrees with those who regard it as an inherited organ, having no special physiological function, but of high morphological importance. It is, he says, "als eine lokale Einstülpung des Ektoderms angelegt; die Zellen dieser Einstülpung scheiden eine Cuticula aus, die mit der zur selben Zeit von der Oberfläche

des Embryo ausgeschiedenen Cuticularhaut im Zusammenhange steht." It has, he continues, the most striking resemblance to "der sogenannten Schalengrube der Mollusken."

Having previously observed that, "vorausgesetzt das bei den Orchestien, ähnlich dem, was bei anderen Crustaceen beobachtet wurde, die das Zerfallen des Dotters in Dotterschollen hervorrufenden Zellen zum Aufbaue des Mittel-darmes verbraucht werden, nimmt das Entoderm seinen Ursprung von dem Zellen des kugelförmigen Organes," Ulianin thus concludes:—"ähnlich wie bei anderen Crustaceen entsteht bei den Orchestien das Mesoderm durch Zersplitterung des Blastoderms, während das Entoderm aus vom Ektoderm abstammenden und in den Dotter einwandernden Zellen zusammengesetzt wird. Die Thatsache, dass die in den Dotter einwandernden Zellen von den Zellen des kugelförmigen Organes abstammen, kann uns auch nicht sehr befremden: das kugelförmige Organ ist, wie oben gezeigt wurde, ein ererbtes verkümmertes Organ, das seine frühere Bestimmung mit der Zeit verloren hat und dem im Laufe der Zeit neue Funktionen bei der Bildung des Entoderms aufgelegt wurden."

1881. Wrześniowski, August.

Goplana polonica nowy rodzaj i gatunek skorupiaka obunogiego z okolic warszawy opisal August Wrześniowski. Warszawa, 1881.

A very useful comparative table is given of the terms used by nine authors in describing the mouth-organs and external parts of Amphipoda, omitting mention, however, of the *labrum* or upper lip. The *labium* or lower lip is called *languette* by G. O. Sars, *zunge* by Dybowsky, *Paragnathen* by Claus, but *Unterlippe* is used by Dybowsky for the second maxillæ, and by Claus (as an alternative) for the maxillipeds. Dybowsky is here said to call the uropoda *Schwimmbeine* and *Springbeine*, but that does not quite accurately represent him, since in reality he calls the three pairs of pleopoda *Schwimmbeine*, the first two pairs of uropoda *Springbeine*, and the last pair *das Steuerbein*. It is a mistake also to say that Dybowsky gives *metacarpus* as an alternative for the "Handwurzel" or wrist of the gnathopods; in fact he gives the word *carpus*, as might be expected, though for the corresponding joint in the first two pairs of peræopods he gives "Afterhandwurzel (pseudocarpus)," and in the last three pairs "Fusswurzel (metatarsus)." According to the lists here given, *tarsus* is used by Claus and Heller as an alternative for *carpus*, by Dybowsky as an alternative for Fusstück (the name which he gives to the hand in the last three pairs of peræopods), and by Milne-Edwards, in the form *tarse*, as an alternative for doigt or dactylopodite.

The structure of *Goplana polonica* is illustrated by Plates X. and XI., of which the explanation is given in French as well as in Polish.

1882. Chilton, Charles, born 1860 (Chilton).

Additions to the New Zealand Crustacea. (Read before the Philosophical Institute of Canterbury, 13th October 1881.) On some Subterranean Crustacea. (Read before Phil. Inst. Cant., 3d November 1881.) Art. XXIV., XXV. From the Transactions of the New Zealand Institute, Vol. XIV. 1881. Wellington, 1882. pp. 171–180. Pl. VIII. fig. 3*a*, 3*b*. Pl. IX. X.

Art. XXIV. points out the resemblance of the first gnathopods of *Microdeutopus maculatus*, G. M. Thomson, to those of *Aora gracilis* and *Aora typica*. Art. XXV. describes and figures the new well-shrimps *Crangonyx compactus*, *Calliope subterranea*, and *Gammarus fragilis*.

1882. Faxon, Walter.

Bibliography to accompany "Selections from Embryological Monographs" compiled by Alexander Agassiz, Walter Faxon, and E. L. Mark. 1. Crustacea. By Walter Faxon. Bulletin of the Museum of Comparative Zoölogy. At Harvard College. Vol. IX. No. 6. Cambridge, 1882.

1882. Haswell, W. A.

Catalogue of the Australian Stalk and Sessile-Eyed Crustacea. The Australian Museum. Sydney. 1882. pp. xvi–xx, 212–275, 310–314, 325. Pl. IV.

This important work gives in the Introduction a general account of the structure of the Amphipoda. The accounts of Mr. Haswell's own species are reproduced from his earlier publications already noticed. Among the *addenda et corrigenda* at the end of the volume, he remarks that "the species on which the genus *Neobule* was founded belongs to the *Orchestidæ*, and is allied to the form afterwards named by me *Aspidophoreia*." He had previously placed *Neobule* in the subfamily Stegocephalides. The name *Glycera* is now altered to *Glycerina*, *Glycera* being preoccupied. The species *Icilius punctatus* is recognised as only a variety, and therefore a synonym, of *Icilius australis*.

1882. Hay, O. P.

Notes on Some Fresh-water Crustacea, together with Descriptions of Two New Species. The American Naturalist. February, 1882. Vol. XVI. No. 2. Philadelphia. pp. 143–146.

Crangonyx lucifugus, n. sp. "a small, rather elongated species, that was obtained from a well in Abingdon, Knox county, Illinois," "appears to resemble *C. tenuis* Smith, but is evidently different. In that species, as described by Prof. S. I. Smith, the first pair of feet are stouter than the second, and have the palmar margin of the propodite much more oblique. The reverse is true of the species I describe. Nor do I understand from the description of *C. tenuis* that the posterior caudal stylets each consist of a single segment. There are some minor differences. From *C. vitreus*, judging from Prof. Cope's description in American Naturalist, Vol. vi. p. 422, it must differ in the caudal stylets. 'Penultimate segment, with a stout limb with two equal styles,' is a statement that will not apply to my species, whichever the 'penultimate' segment may be."

Mr. Hay next describes "*Crangonyx bifurcus*, n. sp.—General form and appearance those of the Western variety of *C. gracilis*." "This species," he says, "differs from *C. gracilis* more particularly in the form of the telson, and in the length of the outer ramus of the posterior stylets as compared with the peduncle. From *C. antennatum* Packard (American Naturalist, 1881, p. 880), it differs in the form of the telson, and in the much greater size of the eyes." Found in a rivulet at Macon, Miss. "The three species, *C. gracilis*, *C. bifurcus* and *C. lucifugus* present an interesting gradation in the form of the posterior caudal stylets. In the first-named the outer ramus is twice the length of the peduncle, and the inner ramus is present, but rudimentary. In *C. bifurcus* the outer ramus is but two-thirds as long as the peduncle, while it is doubtful whether there is anything whatever to represent inner ramus. In *C. lucifugus* both the outer and inner rami are absent, and the peduncle itself is much reduced."

1882. Hoek, P. P. C.

Die Crustaceen, gesammelt während des Fahrten des "Willem Barents" in den Jahren 1878 und 1879. 75 pp. mit 3 Taf. Separ.-Abdruck aus dem "Nied. Arch. für Zool." Suppl. Band I. 1882.

The part concerning the Amphipoda, beginning at p. 41, describes the new species, *Socarnes ovalis*, Taf. III. fig. 29–29*c*., given as a link between *Socarnes* and *Ichnopus*, but recognised by G. O. Sars, in 1885, as a synonym of *Socarnes bidenticulatus*, Sp. Bate (sp.); *Anonyx debruynii*, Taf. III. fig. 30–30*c*., noted as having much in common with *Anonyx ampulla*; *Haploops læcis*, Taf. III. fig. 31; *Podocerus tuberculatus*, Taf. III. fig. 32. Brief observations are made upon *Onesimus leucopis*, G. O. Sars; *Tryphosa höringii*, Boeck; *Acanthozone cuspidata*, Lepechin (with criticism of the figure given by Buchholz, in 1874); *Gammarus locusta*, Linn.; *Ampelisca eschrichti*, Kröyer, and others. A short appendix refers to Stuxberg's recently published Evertebratfaunan i Sibiriens Ishaf. There is a Literatur Verzeichniss, pages 71–73.

A species closely resembling Hoek's Arctic *Podocerus tuberculatus* was taken by the Challenger near New Zealand.

1882. Lenz, Heinrich.

Die Wirbellosen Thiere der Travemünder Bucht. Theil II. Vierter Bericht der Commission zur wissenschaftlichen Untersuchung der deutschen Meere, für die Jahre 1877 bis 1881. VII. bis XI. Jahrgang. I. Abtheilung. Berlin, 1882. pp. 169–179.

On pp. 174, 175, *Corophium longicorne*, Latr.; *Bathyporeia pilosa*, Lindstr.; *Calliope læviuscula*, Krøy.; *Melita palmata* (Mont.); *Gammarus sabinei* (Leach); *Talitrus locusta*, L., are mentioned, with notes as to their occurrence, and on p. 178, in a summary of the investigations in this region, nine Amphipoda are recorded.

1882. Martens, Eduard von.

Crustacea. The Zoological Record for 1881; being Volume Eighteenth of the Record of Zoological Literature. London, MDCCCLXXXII. pp. 1–38.

1882. Mayer, P.

Die Caprelliden des Golfen von Neapel und der angrenzenden Meeres-abschnitte. Fauna und Flora des Golfen von Neapel und der angrenzenden Meeres-abschnitte herausgegeben von der zoologischen Station zu Neapel. VI. Monographie: Caprelliden von Dr. P. Mayer. Mit 10 Tafeln in Lithographie und 39 Zincographien. Leipzig, 1882.

It is safe to affirm that for a long time to come this work will be absolutely indispensable to every genuine student of the Caprellidæ. The scope and comprehensiveness of it may be inferred from the principal headings in the long table of contents. Under "Systematik,"

are given, historical review; special classification; alphabetical table of the genera and species. These are followed by "Geographische Verbreitung." Under "Anatomie und Histologie," are given, general form of the body, segments, limbs; integument; glands; nervous system; organs of sense; muscles; connective tissue; organs of respiration; circulatory apparatus; organs of nutrition; sexual organs. Next come "Entwickelungsgeschichte," "Biologie," "Phylogenie," under which the structure of the Cyamidæ is considered, and lastly "Literaturliste." The various topics are handled with great thoroughness, and the opinions of earlier writers are minutely and carefully criticised.

Mayer thus defines the family Caprellidæ:—

"Læmodipoden mit schmalen, auf dem Querschnitt annähernd kreisrundem Körper. Kopf und 1. Brustsegment zu einem Cephalothorax verschmolzen, 2.–7. Segment frei. Epimeren fehlen. Kiemen am 2., 3. und 4. oder nur am 3. und 4. Brustfusspaare, schlauchförmig. Abdomen aus höchstens 5, wenigstens 1 Segmente zusammengesetzt, mit höchstens 3, wenigstens 2 stark rückgebildeten Beinpaaren. Vorderfühler stets länger als Hinterfühler. Füsse an Zahl verschieden; die nicht rückgebildeten siebengliedrig, ohne Scheere, aber mit einschlagbarer Klaue."

Up to the date of Mayer's treatise there had been established eight genera, for the arrangement of which various useful tables are given. *Cercops*, *Proto* and *Caprellina* agree in having branchiæ on the second, third and fourth segments; the rest have them only on the third and fourth. *Proto* and *Caprellina* have more than two joints to the flagellum of the lower antennæ; the rest have only two. *Caprella* and *Podalirius* are without the mandibular palp, which is present in the rest. *Proto* stands alone in having seven pairs of complete limbs on the peræon; *Protella* has five pairs complete and two pairs rudimentary; *Cercops*, *Ægina*, *Æginella*, *Caprella*, have only five pairs; *Caprellina* and *Podalirius* have four pairs complete and one pair rudimentary. In *Cercops* the pleon has five segments, in *Protella* two, in the rest only one. In *Ægina*, the abdominal feet are jointed, in *Æginella* not jointed. But of *Cercops* and *Æginella* Mayer does not speak from his own observation.

Within the genus *Caprella*, the species may be divided, as pointed out by Haller, into two groups, those in which the lower antennæ carry "Ruderborsten," and those in which they carry "Sinnesborsten." They may be otherwise divided into two groups, according as in the male the basal joint of the second gnathopod is very long or is short.

To *Cercops* is assigned the single species "*Cercops Holbölli*, Kröyer." *Proto*, Leach, has the synonymy, *Leptomera*, Latreille; *Naupredia*, Latreille; *Naupridia*, Milne-Edwards; *Proton*, Desmarest. The species assigned to it are, *rostricosa*, O. F. Müller; *brunneorittata*, Haller; "*Novæ-Hollandiæ*," Haswell; and "*? Proto cornigera*," Haswell, for *Caprella cornigera*, Haswell. This last species has three pairs of branchiæ arranged as in *Proto*, but the first three pairs of peræopods have not been observed, only the muscles of the body going to them are so little developed, as to produce the impression that the limbs themselves may be rudimentary, in which case Mayer would place the species in a new genus, *Hircella*, a name adopted by Haswell in 1884, without further observation of the appendages in question.

The genus *Caprellina*, Thomson, has the one species *longicollis*, Nicolet, with "Novæ-Zealandiæ," Thomson, and *brevicollis*, Nicolet, for synonyms.

Protella, Dana, has the species *phasma*, Montagu; *gracilis*, Dana, with *australis*, Haswell, as a possible synonym; *echinata*, Haswell, for *Caprella echinata*, Haswell; and "*Haswelliana*," Mayer, n. s., in which the last two segments of the peræon are coalescent. Haswell, in 1885, says of his *Protella australis* that "it is a very well-marked species and quite distinct from *P. gracilis* of Dana, to which Mayer is inclined to unite it, both in the form of the head and of the gnathopoda. The gnathopoda are not unlike those of *P. dentata* [? C. dentata] but in other respects the two species are quite different." Mayer remarks

that if Boeck's *Æginа echinata* should prove to be a *Protella*, Haswell's *Protella echinata* might be renamed *echinimana*.

To the genus *Æginа*, Kröyer, Mayer assigns *Æginа longicornis*, Kröyer, with *Æginа lævis*, Boeck, for a synonym; and *Æginа echinata*, Boeck, with the synonymy, *Æginа spinosissima*, Stimpson; *Caprella spinifera*, Bell; *Caprella spinosissima*, Bate, and *? Caprella spinosissima*, Norman. Of these, however, the first three represent *Æginа spinosissima*, Stimpson, 1854, and the fourth is *Caprella horrida*, Sars (see Note on Sars, 1885). As doubtful species of *Æginа* are mentioned Dana's "*A.? aculeata*" and "*A.? tenella*," from the Sooloo Sea, of which Dana thought the former might be the female, the latter the male, of one and the same species. *Æginella*, Boeck, distinguished from *Æginа* only by having the appendages of the pleon unjointed, has the solitary species *Æginella spinosa*, Boeck, also marked out by the strong dorsal spine at the beginning of the first peræon-segment. A spine on this segment is to be noted also in *Caprella spinulata*, Couch, 1852.

In regard to the genus *Caprella*, Lamarck, Mayer calls attention, as Kroyer had already done, to the great variability in the species, which has led to the introduction of many needless specific names. He lays down a sort of canon, that "a single specimen of small size can only be determined with any certainty under favourable circumstances." New species ought not as a rule to be established without an opportunity of examining an adult male specimen. Of about ninety named species Mayer has been able to refer ten to other genera of Caprellidæ, about ten he has had to leave uninvestigated; of the remaining seventy he has been able to recognise ten as undoubted species, the remainder consisting partly of synonyms, partly of species perhaps good and tenable, partly of such as are absolutely indefinite (unbestimmbar). His ten well-ascertained species are thus classified:—

"A. Hinterfühler mit Sinneshaaren. Dimorphismus bedeutend.

Stamm völlig glatt; 2. Arm des erwachsenen Männchens lang, Hand desselben ausserordentlich gross und dick . *C. grandimana*, n. s.

Stamm entweder auf allen oder wenigstens den drei letzten Segmenten mit paarigen oder unpaaren dorsalen Höckern oder Dornen; 2. Arm des erwachsenen Männchens kurz, Hand desselben im Verhältniss nicht so stark entwickelt wie bei der vorigen Art. . . . . *C. acanthifera*, Leach.

"B. Hinterfühler mit Ruderhaaren. Dimorphismus wechselnd.

Stirnstachel fehlt.

Körper ungemein bestachelt. 2. Arm kurz. . . *C. tuberculata*, Bate and Westwood.

— dorsal ganz glatt. 2. Arm kurz. . . *C. æquilibra*, Say.

— nur auf Segment 5–7 bestachelt. 2. Arm des erwachsenen Männchens lang . . . *C. linearis* (Linné) Bate.

Stirnstachel vorhanden.

2. Arm des erwachsenen Männchens kurz.

Geissel des Vorderfühlers mit 19–20 Gliedern . *C. septentrionalis*, Kroyer.

Geissel des Vorderfühlers mit 14 Gliedern.

Kiemen länglich. 5. und 6. Segment mit Höckern *C. dentata*, Haller.

— rund. 5. und 6. Segment glatt . *C. acutifrons*, Latreille.

2. Arm des erwachsenen Männchens lang.

2. Hand desselben normal . . . . *C. attenuata*, Dana.

2. — — ungewöhnlich lang . . *C. inermis*, Haswell."

To this table I have added the names of the authors of the species from the accounts given by Mayer further on.

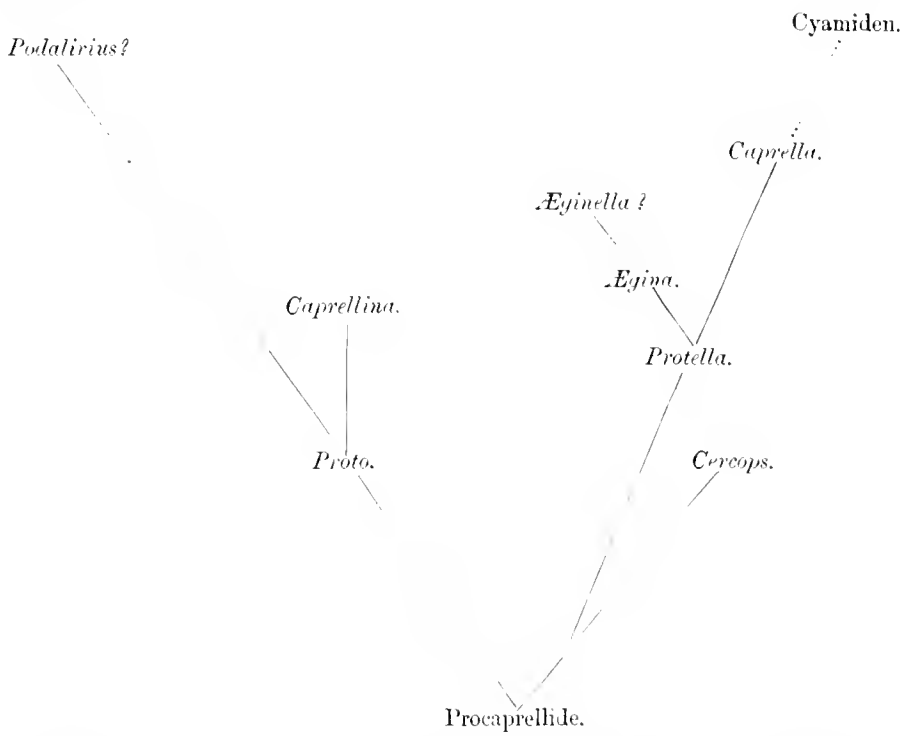
To his new species, *Caprella grandimana*, Mayer assigns the earlier "Caprella Dohrnii," Haller, as a synonym, apparently rejecting Haller's name on the ground of some uncertainty connected with his species, and what seems to be an error in the description. It must be observed also that the name *Caprella inermis*, Haswell, requires to be changed, having been already used by Grube for a different species. As it appears to be undistinguishable "from *Caprella Danilerskii*," Czerniavski, it may as well be known by that name. With *Caprella tuberculata*, Bate and Westwood, Mayer suggests the possible identification of de Quéronie's *Puce de Mer argenteuse*, Fig. A., B. (1780), which in my opinion is quite out of the question.

The genus *Podalirius*, Kröyer, receives three species, distinguished in the following table :—

"Palmarrand der Grossen Greifhand beim Männchen mit einem kleineren proximalen und einem grösseren medialen Fortsatz, .	*P. typicus*, Kröyer.
"Palmarrand der Grossen Greifhand ohne den medialen Fortsatz :	
Hinterbeine enorm verlängert, Palmarrand ohne Einschlaghaken, ...	*P. Kröyeri*, Haller.
Hinterbeine kurz, Palmarrand mit Einschlaghaken, .	*P. minutus*, n. s."

Traces of the first and second peræopods are stated to be present in "*Podalirius Kröyeri*." To *Podalirius minutus* is assigned as a synonym *Podalirius typicus*, Hoek.

Under the head of Phylogenie, at page 192, the following hypothetical table of genealogy is given :—



One hundred and thirty-one works are mentioned in the Literaturliste and Nachtrag, pages 194–201, which, with a few unavoidable exceptions, have been carefully studied and are here minutely criticised by Mayer.

Taf. i., a double plate, gives figures, lateral and dorsal, of both sexes of the following species, *Proto ventricosa*, *Protella phasma*, *Podalirius kröyeri*, *Podolirius minutus*, *Caprella*

grandimana, *Caprella acanthifera*, *Caprella æquilibra*, *Caprella dentata*, *Caprella acutifrons*, all found in the Gulf of Naples. The remaining nine plates give numerous and important details of the structure both external and internal of various species. There are also various illustrations interspersed with the text.

Attention may be called to the section on the salivary gland, as Mayer says, p. 145, that "Alle Autoren ohne Ausnahme schweigen von den Speicheldrüsen."

1882. Sars, G. O.

Oversigt af Norges Crustaceer med forelobige Bemærkninger over de nye eller mindre bekjendte Arter. (Podophthalmata—Cumacea—Isopoda—Amphipoda) (med 6 autographiske Plancher) (Christiania Videnskabsselskabs Forhandlinger 1882. No. 18. Fremlagt i Modet den 13de Oktober).

A list is given of 294 species of northern Amphipoda, 8 of them *Hyperina*, 268 *Gammarina*, and 18 *Caprellina*. The *Gammarina* are distributed among 22 families, the subfamilies of Boeck being dropped. Forty new species are figured and described, namely; 95. *Clydonia borealis*, rather to be called *Tyro borealis*; 97. *Lysianella petalocera*, a new genus, of which the special characteristic is said to be the peculiar development of the penultimate joint of the peduncle of the lower antennæ, "insolito modo dilatato, laminari, facie interna seriebus numerosis transversis ciliorum exornata." The undivided telson brings it near to the genus *Lysianassa*, from which it is distinguished by the antennæ, the first maxillæ "lobo incisivo angusto spinis minutis crebris armato, palpo brevi, lobo interno angusto, bisetoso," and the first gnathopods "sat breves, distincte subcheliformes, manu carpo parum longiore leviter attenuato, apice oblique truncato;" 98. *Ichnopus umbonatus*; 99. *Orchomene pectinatus*, said to be distinguished from *Orchomene serratus*, Boeck, by the pale, narrow, subsigmoid eyes, the high, compressed gibbosity on the fourth pleon-segment, and other details; 100. "*Orchomene Batei*," "= Anonyx Edwardsii Sp. Bate (non Kroyer) ♀ = Lysianassa longicornis Sp. Bate ♂." Professor Sars says that Boeck seems not to have had this form under his notice, otherwise he could not have identified it with his *Orchomene serratus*, which is very distinct and the same as *Lysianassa crispata*, Goës. As it is not the same as Kroyer's *Anonyx edwardsii*, with which Bate had identified it, Sars renames it *Orchomene batei*, which, however, cannot rightly, I think, be made to include the species which Sp. Bate calls *Lysianassa longicornis*, Lucas; 102. *Tryphosa ciliata*, apparently very near to *Tryphosa nana*, Kroyer; 104. *Normania latimana*, provisionally referred to the genus *Normania*, but without examination of the mouth-organs; 110. *Phoxus falcatus*, "= *Phoxus simplex* Boeck non Sp. Bate," the name proposed for this species (already described by Boeck, but by him incorrectly identified with Bate's species), referring to the characteristic form of the rostrum; 112. *Stegocephalus gibbosus* said to be easily distinguishable from the two other northern species by the "Epimera 4ti paris permagna, antecedentibus junctis plus duplo majora, postice valde producta et æqvaliter rotundata, distincte latiora quam altiora" and by the "segmentum 3tium corporis postici supine in gibberum acutum desinens, epimeris in medio marginis posterioris processum acuminatum leviter recurvum formantibus, angulis inferioribus obtuse rotundatis;" 113. *Stegocephalus auratus*, said to resemble *Stegocephalus christianensis*, Boeck, but to be distinguishable by its smaller size, a broad orange stripe over the back, and the structure of the fifth peræopods with "articulus basalis permagnus, laminaris, ceteris junctis multo longior, ad marginem posticum dense serratus et deorsum in angulum valde prominentem et ultra articulum 4tum porrectum excurrens;" 114. *Audania pectinata*, said to be near *Audania nordlandica*, Boeck, but to

be distinguished from it by the first gnathopods "ungve terminali spinis 4 pectinatim ornato," the second gnathopods, "ungve terminali spinis 2 armato," the "epimera 4ti paris antecedentibus junctis circiter æqvalia, obliqve triangularia, postice obtuse producta, margine inferiore parum arcuato," and by the "pedes ultimi paris articulo basali subelliptico deorsum rotundato-producto, margine posteriore lævi; articulo 3tio qvam in A. nordlandica minus dilatato;" for the relationship of this species to *Stegocephalus*, see Note on Aurivillius, 1885; 115. *Amphilochus inermis*, said to be very like *Amphilochus manudens*, Sp. Bate, but having the hand of the first gnathopods "angulo anteriore non in spinam producto," and distinguished from *Amphilochus odontonyx*, Boeck, by the second gnathopods, in which the hand is much larger than in the first pair, "apicem versus dilatata, acie arcuata calce carpi angusta et elongata ad aciem manus porrecta," and by the very elongate telson;" 116. *Stegoplax longirostris*, new species of a new genus, of which Sars says "this curious little Amphipod obviously belongs to the Family Amphilochidæ, but is so different from the forms hitherto known that it must be made the type of a new genus. The chief characters are the enormous development of the third and fourth pairs of side-plates, and the rudimentary structure of the two first pairs, also the narrow linear form of the basal-joint of the third and fourth peræopods, by which it recalls the genus Stegocephalus." It is very near to, if not synonymous with, the earlier genus *Peltocera*, Catta, 1875, and the genus *Cyproidia*, Haswell, 1880; see Notes on Catta and Haswell under those dates; 117. *Stenothoë tenella*, distinguished from the two other northern species of *Stenothoë* by the less strongly built body, the thin antennæ and peræopods and light-coloured eyes; 118. *Stenothoë brevicornis*, like *Stenothoë monoculoides* in the very short antennæ, distinct in the much less developed side plates; 119. *Metopa rubrovittata*, recognised by Sars as standing very near to *Metopa alderi*, Sp. Bate, but distinguished from it by its far smaller size, the antennæ of uniform length, the hand of the second gnathopods, thus described, "pedes 2di paris robusti, manu magna, oblonga, acie brevi, fere transversa, subtiliter serrulata, inferne processu dentiformi sat prominente apici quam basi multo propiore definita;" and the colouring, "corpus pellucidum fasciis transversis angustis ex parte interruptis colore intense purpureo ornatum;" 120. *Metopa leptocarpa*, "pedes primi paris forma insolita, tenuissimi, fere filiformes, carpo valde elongato et angusto, manu apicem versus leviter dilatata, acie transversa et inferne distinctissime definita;" 122. *Metopa borealis*, synonymous with *Metopa bruzelii*, Boeck, non Goës, being distinguished, Sars says, from *Metopa bruzelii*, Goës, by its more considerable size, shorter antennæ, first gnathopods "articulo 3tio inferne parum producto, manu medio leviter dilatata carpi longitudinem æquante," and by the second gnathopods in which the palm is more coarsely serrate and the lower angle more prominent; 123. *Metopa calcarata*, distinguished by the relatively large oval eyes, the much dilated and downward produced third joint of the hinder peræopods and by the second gnathopods in the male, which are "permagni, manu valde elongata, subarcuata, margine inferiore dense ciliato et antice eminentiam serratam præbente, ungve terminali fortissimo margine altero ciliato;" 124. *Metopa spreparia*, the hand of the second gnathopod in the male "valde prælongata, subarcuata, margine inferiore toto dense ciliato in medio dentibus 2 et prope apicem eminentia subtiliter serrata armato, acie non definita, ungve terminali validissimo manu longiore in margine interno ciliato;" 128. *Bruzelia tuberculata*, near *Bruzelia serrata*, but distinguished from it, Sars says, by want of any proper dorsal carina, though all the segments are raised above into protuberances, also by the blunt lateral carina, and by the lower hinder angles of the third pleon-segment, which are "acuminati et valde sursum curvati margine inferiore serrato;" 129. *Œdicerus microps*, near *Œdicerus lynceus*, M. Sars, but scarcely half the size, with a shorter, less inflated rostrum, smaller eyes, second joint of upper antennæ linear, hands of the first and second gnathopods more elongate, third uropods very long; 131. *Halimedon*

megalops, distinguished by the uncommonly thick arched rostrum and large, confluent eyes; 132. *Halicreion (?) latipes*, only provisionally referred to Boeck's genus, as Sars recognises that the third uropods are not longer than the second, which is the case in the typical species, *Halicreion longicaudatus*, and that the proportions of the first four pairs of peræopods in the two species are very different; 133. *Paramphithoë brevicornis*, with a general resemblance to species of *Metopa*, to be distinguished from its own allies by its small size, pale colour, and unusually short antennæ; 134. *Paramphithoë assimilis*, nearest to *Paramphithoë glabra*, Boeck, but distinguished by the eyes, "magni, rotundato-triangulares," the "epimera anteriora mediocria, dente anguli infero-posterioris fere obsoleto," the two gnathopods "manu elongato-ovata in 2do pari paulo majore, acie bene definita, obliqva, margine inferiore spinis nonnullis et fasciculis pilorum ornato," and the considerably greater length of the peræopods; 136. *Iphimedia minuta*, distinguished from *Iphimedia obesa*, Rathke, by Professor Sars by its having no spine on the first joint of the upper antennæ and by the different form of the two pointed processes at the lower hinder angle of the third pleon-segment, as well as by its small size and very different colouring; distinctions of somewhat doubtful specific value, that of colour above all being untenable in face of the numerous variations which *Iphimedia obesa* undoubtedly presents; 137. *Atylus uncinatus*, very like *Atylus swammerdami*, M.-Edw., but distinguished by the very remarkable first peræopods "structura singulari, organa valida affixionis formantes, articulo 4to brevissimo, cupuliformi, 5to magno et curvato ad basin fasciculis 2 spinarum armato, ungve terminali fortissimo, falciformi," a species which appears to be synonymous with *Atylus falcatus*, Metzger, 1871; 138. *Halirages megalops*, distinguished from its ally *Halirages bidentatus*, Bruzelius, by the enormously developed eyes and the "segmenta 2 priora corporis postici supine medio in processus singulos acutos producta; segmentum 3tium ad angulum infero-posteriorem truncatum et fortiter serratum; 139. *Halirages inermis*, to be recognised by its slender body, want of dorsal processes, thin, elongate peræopods, and the sides of the head produced downwards into conical processes; 141. *Amphithopsis nodifera*, distinguished by a pair of tubercles on the back of the first, and another pair on the back of the second, pleon-segment; 143. *Tritropis inflata*; 144. *Tritropis avirostris*, which, with the preceding species, must be transferred to *Rhachotropis*, S. I. Smith; 147. *Melita pellucida*, "corpus pellucidissimum absqve pigmento. Longit. 5^mm.^"; 149. *Ampelisca gibba*, in the form of the last peræopod said to be very like *Ampelisca lævigata*, Lilljeborg, but clearly distinguished by the different form of the head, although nothing in the figures and descriptions given respectively by Sars and Boeck of *Ampelisca gibba* and *Ampelisca lævigata* seems to justify the separation of the former from the latter; 151. *Ampelisca anomala*, a species of importance as a link between the two genera *Ampelisca* and *Byblis*, even without links sufficiently close. In the general form of the body and development of the side-plates, the new species, according to Sars, is a genuine *Ampelisca*, whereas the two basal-joints of the lower antennæ are quite uncovered as in the genus *Byblis*. The last uropods extend indeed beyond the others, but still are far from being as strongly developed as is usual in species of *Ampelisca*; 153. *Byblis erythrops*, distinguished from *Byblis gaimardii* by smaller size, red eye-pigment, longer upper antennæ, and by the penultimate joint of the peduncle of the lower antennæ being distinctly shorter than the last joint; 154. *Photis tenuicornis*, the antennæ shorter and thinner than usual, sparsely pilose with short bristles, the palm of the first gnathopod obliquely excavate, of the second "bisinuate"; 156. *Gammaropsis melanops*, "= *G. erythrophthalma* Boeck, non Lilljeborg," distinguished by Sars from Lilljeborg's species by the shorter secondary flagellum of the upper antennæ, the acute antero-lateral angles of the head, and the also acute infero-posterior angle of the third pleon-segment, while, further, the eyes in this species are black, not red, as required by the

very name of Lilljeborg's species; 157. *Podocerus minutus*, a minute form distinguished by Professor Sars from *Podocerus falcatus*, Montagu, on the ground of its far smaller size, the eyes considerably larger, the slighter unciliated lower antennæ, the slenderer peræopods and the different colouring. As to the last point, "color flavescens fusco variegatum" would often precisely describe specimens of *Podocerus falcatus*. The difference in the second gnathopods of male and female is just what is found in the *pulchellus* and *variegatus* forms of *Podocerus falcatus*. Boeck speaks of having taken *Podocerus falcatus* at 20 fathoms depth, so that the occurrence of *Podocerus minutus* at a depth of 20 to 30 fathoms will not be, as Sars appears to suggest, an additional evidence of its distinctness. May it not be the *Ischyrocerus minutus* of Lilljeborg, 1851; 159. *Siphonœcetes pallidus*, said to be distinguished from *Siphonœcetes typicus*, Kr., and *Siphonœcetes colletti*, Boeck, by its small size, pale colour, and the antennæ thus described, "1mi paris dimidio corpore longiores, articulis pedunculi sensim magnitudine decrescentibus, flagello articulis pedunculi 2 ultimos junctos longitudine æqvante vel paulo superante, 6-articulato; 2di paris validæ corporis longitudinem excedentes, margine utroqve valde setoso, articulo ultimo pedunculi penultimo nonnihil breviore;" 165. *Caprella ciliata*, the second gnathopods as figured and described corresponding so exactly in form and ciliation to those often met with in *Caprella acanthifera*, Leach, as to raise a presumption that Sars' specimens may belong to that very variable species. The elongate flagellum of the upper antennæ, the only other distinctive mark to which Sars himself draws attention, is likewise proper to *Caprella acanthifera*. On the other hand, the figure does not show the globose head so notable in that species, to the distinctive shape of which Sars himself calls attention in noticing *Caprella acanthifera*, and the hands of the peræopods are described and figured with "acie prope basin dente minuto armata," whereas in *Caprella acanthifera* the place of insertion of the principal spines, which defines the palm, is not, as in many Caprellæ, near the base of the hand but some way down its margin. In regard to the ciliation or hairiness of the hand of the second gnathopod, a doubt arises whether it may not be merely an adventitious growth; like the hairs depicted by Bate and Westwood on the second peræon-segment of their *Caprella tuberculata*, "die aber nichts Anderes als Pilzhyphen sind," in P. Mayer's opinion.

Besides describing new species, Professor Sars makes important observations on many old ones. He regards *Tauria abyssorum*, Boeck, as a synonym of 91. *Tauria medusarum*, Fabr., so that, combining Sars' view as to the species with that of Bovallius as to the genus, Fabricius' species should be called *Hyperia abyssorum* (Boeck); 92. *Parathemisto abyssorum*, Boeck, is obviously identical with Bate's *Hyperia oblivia*, but as this is distinct from Kroyer's *Hyperia oblivia*, which = *Hyperia galba*, Montagu, Boeck's name is retained. *Tryphana malmii*, Boeck, is referred to Dana's genus *Lycæa* as 94. *Lycæa malmii*. *Lycæa pulex*, Marion, 1874, from the Mediterranean, is said to come very near the northern species. *Lysianassa plumosa*, Boeck, is said to be undoubtedly the male of 96. *Lysianassa costæ*, Milne-Edwards; *Lysianassa umbo*, Goës, which Boeck gives as *Orchomene umbo*, is considered by Sars as belonging to the genus *Lepidepecreum*, Sp. Bate. *Pontoporeia furcigera*, Bruzelius, is considered to be scarcely distinct from 105. *Pontoporeia femorata*, Kroyer, since Kroyer figures the peculiar process on the fourth pleon-segment which has suggested the name *furcigera*. The curious 107. *Argissa typica* of Boeck is said in some degree by its general habit to recall the Ampeliscidæ, and to be slower in its movements than other members of the family Pontoporeiidæ. 108. *Bathyporeia robertsonii*, Sp. Bate, is held by Sars to be a distinct species from the closely allied *Bathyporeia pilosa*, Lindström, in which I cannot agree with him. *Montagua* (*Probolium*) *pollexiana*, Sp. Bate, is mentioned as 125. *Metopa pollexiana*. *Cressa schiödtei*, Boeck, is stated to be a synonym of 126. *Dauaia dubia*, Sp. Bate. 130.

Monoculodes carinatus, Sp. Bate, is disunited from *Monoculodes affinis* of Boeck [which J. S. Schneider thinks may = *Monoculodes stimpsoni*, Sp. Bate]; 142. *Leucothoë furina*, Savigny (Sp. Bate), is thought to be easily distinguishable from *Leucothoë spinicarpa*, Abildgaard, by its slenderer body, a somewhat different form of the gnathopods, and difference of colouring. It may be doubted, notwithstanding, whether any or all of these distinctions suffice to establish the specific difference in question. *Halice grandicornis*, Boeck, is undoubtedly, Sars says, the male of 146. *Halice abyssi*, Boeck. Bate's *Ampelisca gaimardii* (originally *Tetromatus typicus*) is stated to be undoubtedly the male of 148. *Ampelisca tenuicornis*, Lilljeborg, not a separate species, *Ampelisca typica*, as Boeck makes it. But here neither Sars nor Boeck can be right, for the anterior part of the back, both in *Ampelisca tenuicornis* and in Boeck's description of *Ampelisca typica*, is round, while in Spence Bate's species "the anterior half of the animal is much more compressed than the posterior, and narrowed to an angle upon the dorsal surface, the angle increasing anteriorly to the extremity of the head." Hoek is probably right in adopting Norman's suggestion that *Ampelisca carinata*, Bruzelius, is the male of *Ampelisca æquicornis*, Bruzelius, but again neither Norman nor Hoek can be right in uniting *Ampelisca gaimardi*, Sp. Bate, to *Ampelisca carinata*, Bruzelius, for that species has the front part of the back rounded. The name *Ampelisca typica* (Bate, non Boeck) will therefore belong to *Ampelisca gaimardii* (Bate, non Kroyer), while *Ampelisca typica*, Boeck, is united to *Ampelisca tenuicornis*, Lilljeborg. The question, however, remains, whether the specific name of *Tetromatus typicus* can with propriety be retained, when the species to which it refers has been found to belong to a previously established genus. 158. *Corophium bonelli*, M.-Edwards, is distinguished from *Corophium crassicorne*, Bruzelius, by the rounded side-lobes of the head and the far weaker form of the lower antennæ both in male and female. *Siphonœcetes crassicornis*, Sp. Bate, under the title 160. *Cerapus crassicornis*, is referred without doubt to the genus *Cerapus*, Say, as characterised by S. I. Smith. It constructs, out of particles of mud, small, regularly cylindrical tubes, which it carries about with it. The species referred by Boeck to *Cerapus* belong to *Erichthonius*. The females of 163. *Dulichia monacantha*, Metzger, are said to be very like the females of *Dulichia porrecta*, Sp. Bate, while the males are clearly distinguished by the development of the side-plates of the second pair into long forward-directed spine-like processes.

1882. STREETS, THOMAS H.

A Study of the Phronimidæ of the North Pacific Surveying Expedition. Proceedings of the United States National Museum. Vol. V. 1882. pp. 3–9. Pl. I.

Dr. Streets is of opinion that Claus combines in his description of *Phronima sedentaria* more than one species. *Phronima sedentaria* itself Dr. Streets had not had any opportunity to examine. He points out that to Claus is due the discovery that such and such a species known in the female had a male form presenting characteristic differences. He upholds *Phronima atlantica*, Guérin (fig. 1, 1*a*, 2), as a good species, against the researches of Claus, and also *Phronima pacifica*, Streets, fig. 3, 3*a*. In regard to the genus *Phronimella*, Claus, he says, "Claus states that there are 'only two pairs of styliform caudal appendages.' This is true of the female, but not of the male. In one of his plates, where the caudal extremity of a male is given, the three pairs of styliform appendages are very clearly represented." Description and figures (4, 4*a*, 5, 5*a*) are given of *Phronimella elongata*, Claus, with which Dr. Streets identifies his own *Anchylonyx hamatus*, 1877.

1882. Stuxberg, Anton.

Evertebratfaunan i Sibiriens Ishaf. Förelöpande Meddelanden. Vega-Expeditionens Vetenskapliga Jakttagelser. Bd. I. Stockholm, 1882.

E. von Martens in the Zoological Record for 1883 says that *Stegocephalus kessleri*, sp. n., from the northern coast of Asia, is figured but not described (p. 713). Of *Acanthostephia malmgreni* (Goës) a woodcut is given and an account of its general occurrence in the Siberian glacial sea (pp. 724, 729). *Atylus carinatus* (Fab.) is mentioned (pp. 723, 729) for its occurrence in the same sea. "*Weyprechtia*, g. n., for *W. mirabilis*, sp. n., 51 mm. long. Description of the species, but no generic characters given." (See Note on Stuxberg, 1880.)

1883. Blanc, Henri.

Structure des cupules membraneux ou "calceoli" chez quelques Amphipodes. Zoologischer Anzeiger. VI. Jahrgang. 1883. No. 143. pp. 370–372.

For the views explained in this paper see Note on H. Blanc, 1884.

1883. Chevreux, Édouard, born November 10, 1846 (É. C.).

Crustacés amphipodes et isopodes des environs du Croisic. Association francaise pour l'avancement des Sciences. Congrès de Rouen. 1883. pp. 517–520.

In this list of Amphipods from the west coast of France, forty species are mentioned, the habitat being specified from which each was obtained. The determination of the species was made with the assistance of Bate and Westwood's well-known work, and includes "*Gossea microdeutopa* S. Bate," but this M. Chevreux has since informed me was entered in mistake for *Calliopius norvegicus*, Rathke.

1883. Chilton, Charles.

Further additions to our knowledge of the New Zealand Crustacea. (Read before the Phil. Inst. Cant., 7th September, 1882.) Notes on, and a new Species of, Subterranean Crustacea. (Read before the Phil. Inst. Cant., 5th October, 1882.) Art. II. III. Trans. and Proc. New Zealand Inst., 1882. Vol. XV. Wellington, 1883. pp. 77–92. Pl. II. III. IV.

The new species described are *Nicea egregia*, *Cyproidia* (?) *crassa*, *Mera incerta*, *Podocerus frequens*. *Cyproidia* (?) *crassa* differs so much in the form of the coxæ from the other three species belonging to Haswell's genus *Cyproidia* that, as Mr. Chilton himself suggests, it will probably have to find a generic place elsewhere.

Article III. describes and Plate IV. figures *Phreatoicus typicus*, a singular well-shrimp, of a new genus and species, which appears to be an Isopod with some remarkable Amphipodan affinities. The genus is thus defined:—"Body long, sub-cylindrical, laterally compressed. Upper antenna short, lower long, with flagellum. Mandible with an appendage. First pair of legs subchelate, others simple; first *four* pairs articulated to body at the anterior ends of

their segments and directed forwards, last *three* articulated at posterior ends of their segments and directed backwards. Abdomen long, of six distinct segments, last joined to telson. Sixth pair of pleopoda biramous, styliform. Telson large, subconical." See Note on Thomson and Chilton, 1886.

1883–1884. GERSTAECKER, A.

Gliedfüssler: Arthropoda. Dr. H. G. Bronn's Klassen und Ordnungen des Thierreichs wissenschaftlich dargestellt in Wort und Bild. Fortgesetzt von Dr. A. Gerstaecker. Mit auf Stein gezeichneten Abbildungen. Fünfter Band. II. Abtheilung. 9.–15. Lieferung. Leipzig und Heidelberg. 1883, 1884. *Siebente Ordnung.* Amphipoda. Flohkrebse. pp. 279–416. Taf. XXVII.–XLVIII.

This work contains a full and clear account of the organisation and development of the Amphipoda, compiled from all the best authorities, and illustrated by figures given in facsimile from the original works. There is an introductory account of the history of the subject, and a list of authors in a chronological order determined by their first publications about the Amphipoda.

In most cases names of genera and species have been accepted from authors without criticism, it not being within the plan of the work to rectify minor details of classification. The transfer, however, of the Tanaidæ to the Amphipoda is made without reserve. See further, Note on Gerstaecker, 1886.

1883. JOSEPH, GUSTAV.

Berliner Entom. Zeitschrift. XXVII. p. 7. 1883.

The blind *Niphargus orcinus* recorded from the caves of Potis Kawez and Mrzla jama, Carniolia, 51 mm. long. (Zool. Record.)

1883. MARION, A. F.

Esquisse d'une topographie zoologique du golfe de Marseille. Mémoire No 1. Annales du Musée d'histoire naturelle de Marseille.—Zoologie. Tome 1er. Marseille, 1883.

In the "Description des Faunes," the occurrence of *Gammarus locusta* in several localities is recorded, and of other well-known Amphipods at different points. In the "zone émergée," of the littoral zone, it is noticed that *Gammarus marinus* wears "une livrée brunâtre, parfaitement en rapport avec la teinte des débris décomposés de zostères. Souvent, lorsque la vague accumule des débris d'algues vertes (Ulves et conferves), ces Crustacés changent, par mimétisme, de coloration" (p. 42). In the "zone littorale immergée 0 à 2 mètres," "*Melita palmata* et *Nicea nudicornis* ne sont pas rares," under stones scarcely covered by the waves, and *Gammarella brevicaudata* among Algæ (pp. 46, 47). In the "Faune littorale immergée (0 à 2 mètres), dans la région des eaux vives," "les Edriophthalmes des algues encroûtés comprennent les *Caprella acutifrons*, Latr., *Caprella æquilibra*, Say, *Caprella grandimana*, P. May., *Caprella dentata*, Helier, *Tanais vittatus*, Rathke, *Eurysteus erythrophthalmus*, Lij., *Leptochelia Edwardsii*, Kroy., *Podocerus pulchellus*, Leach, *Allorchestes imbricatus*, Sp. Bate (nombreuses variations mimétiques dans la coloration), *Amphithoë littorina*, Sp. Bate (coloration variée)" p. 49.

At page 84, in a footnote, Professor Marion says, "Les Amphipodes sont excessivement abondants dans nos graviers coralligènes; ils se rapportent pour la plupart à des formes nouvelles qui devaient être le sujet d'un mémoire spécial, mais qui n'ont été décrites jusqu'ici que d'une manière préliminaire (voy. Catta: *Note pour servir à l'histoire des Amphipodes du golfe de Marseille*, Revue des Sc. natur., t. IV, nº 2, septembre 1875).

"L'espèce la plus commune est le *Mæra truncatipes*, Spinn., à laquelle sont associées les *Mæra integrimana*, Heller, *Lysianassa Audouiniana*, Sp. B., *Lysianassa spinicornis*, Costa, *Melita palmata*, Leach, *Leucothoë articulosa*, Mont., *Ampelisca Belliana*, Bate, *Iphimedia obesa*, Rathke, *Liljeborgia pallida*, Bate, *Microdeutopus anomalus*, Rathke, *Protomedeia hirsutimana*, Sp. Bate, *Icridium Rissoanum*, Grube et Bate; et quelques Isopodes, *Sphæroma curtum*, Leach, *Anceus forficularis*, Risso, *Praniza ventricosa*, Risso, *etc.*"

1883. Marion, A. F.

Considération sur les Faunes profondes de la Mediterranée d'après les dragues opérés au large des côtes méridionales de France. Mémoire Nº 2. Annales du Musée d'histoire naturelle de Marseille.—Zoologie. Tome 1er. Marseille, 1883.

From the "Sables vaseux au sud de Mairé, profondeur = 65 à 70 mètres; et vase sableuse de 75, 80 et 90 mètres, par le travers de Riou," *Lysianassa longicornis*, Lucas, is recorded (p. 16). Among the species dredged by the *Travailleur* between Marseilles and Corsica were *Leucothoë denticulata* and *Lysianassa ciliata*, and at the deepest station, "234 à 250 mètres," "*Ichnopus taurus*, *Ichnopus calceolatus*, *Ampelisca Gaymardi*."

1883. Martens, Eduard von.

Crustacea. The Zoological Record for 1882; being Volume nineteenth of the Record of Zoological Literature. London, M.DCCC.LXXXIII. pp. 1–39.

It is noted that *Iphigenia*, G. M. Thomson's name for a genus among the Corophidæ, is twice preoccupied in *Mollusca*.

1883. Schneider, J. Sparre.

Nogle zoologiske iagttagelser fra Vardø i Øst-Finmarken. Separataftryk af Tromsø Museums Aarsberetning for 1882. Tromsø. 1883. pp. 16–34.

A list, accompanied by short notes, is given, pp. 27–30, of thirty-five Amphipods, none described as new, including two littoral forms, *Cyamus boopis* parasitic on *Megaptera boops*, and the rest from depths between five fathoms and thirty.

1883. Schneider, J. Sparre.

Bidrag til en nøiere karakteristik af de ved Norges kyster forekommende Arter af familien Oedicerida. Separataftryk af Tromsø Museums Aarshefter VI. Tromsø. 1883. 44 pages. 3 Pl.

The subfamily Oedicerina, Lilljeborg, 1865, Oedicerinæ, Boeck, 1870, was called by G. O. Sars, in 1882, the family Oedicerida. This change is here accepted. Great weight is laid on the

stiliform character of the finger or last joint in the fifth peræopods, as a distinctive mark in this family. A general description is given of the head, side-plates, mouth-organs, limbs and telson. This is followed by a conspectus of the Norwegian genera and species which the family includes.

Pontocrates norvegicus, A. Boeck, is identified with *Kroyera altamarina*, Sp. Bate, instead of with *Kröyera arenaria*, Sp. Bate, with which Boeck himself made it synonymous. On this see further, Note on J. Sparre Schneider, 1885. *Monoculodes affinis*, A. Boeck, is thought to belong rather to *Monoculodes stimpsoni*, Sp. Bate, than to *Monoculodes carinatus*, Sp. Bate. A relationship is suggested between *Monoculodes grubei*, A. Boeck, and *Monoculodes longicornis*, of the same author. A species is described under the title *Halimedon saussurei*, A. Boeck?, with the authority of Professor G. O. Sars for its being so entitled, but it is said not to agree well with the figures and description by Boeck, and both in appearance and in the structure of the mouth-organs to be unlike the genus *Halimedon*.

1883. Smith, Sidney I.

List of the Crustacea dredged on the Coast of Labrador by the expedition under the direction of W. A. Stearns, in 1882. pp. 218–222. Review of the Marine Crustacea of Labrador. pp. 223–232. Proceedings of United States National Museum. Vol. VI. Washington, 1883.

In the "List," sixteen species of Amphipoda are recorded, none of them new. To *Rhachotropis aculeata*, Lepechin sp., is appended a note, "Ῥάχις et τρόπις, nom. nov., vice *Tritropis* Boeck, præoc."

The review takes into account Professor Packard's papers:—"A list of the animals dredged near Caribou Island, southern Labrador, during July and August, 1880," (Canadian Naturalist and Geologist, viii., pp. 401–429 (1–29), December, 1863), and his "View of the recent invertebrate fauna of Labrador" (Memoirs Boston Soc. Nat. Hist., i. pp. 262–303, pls. 7, 8, 1867). Professor Packard's Amphipoda had been determined by various authorities, and much confusion had arisen, which Professor Smith in this paper sets himself as far as possible to correct. "In determining Professor Packard's species I have been greatly aided," Professor Smith says, "by a set of his specimens collected in 1864 and labeled by him for the Museum of Yale College."

"*Anonyx producta*, fide Boeck," Packard, 1867, is referred to *Anonyx pumilus* Lilljeborg; *Monoculodes nubilatus* Packard, 1867, to *Œdiceros lynceus* M. Sars; *Amphithonotus cataphractus* Packard, 1867, to *Pleustes panoplus* Bate (Kröyer); *Atylus vulgaris* Packard, 1867, to *Pontogenia inermis* Boeck (Kröyer); "*Atylus* (*Paramphitoe* [—*thoe*]) *inermis* (Kroyer, fide Boeck)," Packard, 1867, to *Halirages fulvocinctus* Boeck (M. Sars); *Gammarus mutatus* Packard, 1863, to *Gammarus locusta* Fabricius; *Gammarus purpuratus* Packard, 1863, and *Gammarus dentatus* Packard, 1867, both to *Melita dentata* Boeck (Kröyer); *Amphitonotus Edwardsii* Packard, 1867, to *Rhachotropis aculeata* Smith (Lepechin); *Ampelisca pelagica* Packard, 1863 and 1867, to *Ampelisca macrocephala* Lilljeborg; *Ampelisca Gaimardi* Packard, 1867, to *Byblis Gaimardii* (Kröyer); *Amphithoe maculata* Stimpson, 1853, Packard (*Amphithoe*), 1867, Smith, 1874, to *Amphithoe podoceroides* Rathke, 1843; *Cerapus rubricornis* Stimpson, 1853, Packard (*rubiformis*), 1867, to *Erichthonius difformis* Milne-Edwards; *Glauconome leucopis* Kröyer, to *Unciola irrorata*, Say.

1883. Stebbing, T. R. R.

The Challenger Amphipoda. The Annals and Magazine of Natural History. March 1883. Ser. 5, vol. xi. pp. 203-207. London, 1883.

A few of the more striking forms among the new Amphipods brought home by the Challenger, which had been entrusted to me in the summer of 1882, are here briefly described:—in Boeck's subfamily Oedicerinæ, *Acanthostepheia ornata*, n. sp., since transferred to a new genus as *Œdiceroides ornata*, and *Œdiceropsis rostrata*, n. sp., now called *Œdiceroides conspicua*, the specific name *rostrata* having become inappropriate in the change of genus; in the subfamily Epimerinæ, *Epimeria conspicua*, n. sp., with the remark that it may prove to be only a variety of *Epimeria loricata*, G. O. Sars, of which I now consider it a synonym, and *Acanthozone tricarinata*, n. sp., since transferred to a new genus as *Acanthechinus tricarinatus*; in the subfamily Gammarinæ, *Amathillopsis australis*, n. sp., nearly allied to *Amathillopsis spinigera*, Heller, and *Amathillopsis affinis*, Miers; in the subfamily Stegocephalinæ, *Andania gigantea*, n. sp.; in the subfamily Iphimedinæ, *Iphimedia pulchridentata*, n. sp., and *Iphimedia pacifica*, n. sp., and lastly, in the family Caprellidæ, *Dodecas elongata*, n. g. et sp.

The new genus *Dodecas* is thus defined:—"The mandibles having an elongate triarticulate palp. Six pairs of feet attached to the pereion, the fourth segment having none. Branchial vesicles at the base of the second gnathopods, the first pereiopods, and attached to the footless fourth pereion-segment, the rudimentary pleon having two pairs of biarticulate appendages."

Heller placed his new genus *Amathillopsis* between *Amathilla* and *Gammaracanthus*, two genera of the Gammarinæ. In accordance with this arrangement I placed the new species, *Amathillopsis australis*, in that subfamily, but in view of the elongated palps of the maxillipeds I am now doubtful as to the propriety of this classification.

1883. Woodward, Henry.

Crustacea. Cassell's Natural History. Vol. VI. London, Paris and New York, 1883.

The Class Crustacea, page 196, has for its first division the Thoracipoda, with two legions, 1. Podophthalmia, containing two orders, 2. Edriophthalmia, also containing two orders, the Isopoda and Amphipoda. The latter, pages 212–213, include the Læmodipoda as an aberrant group. No mention is made of the Hyperina. The statement that the body-rings of the Amphipoda are compressed laterally requires some limitation in regard to such genera as *Lafystius*, *Icilius* and *Corophium*. The illustrations given are "*Orchestia Darwinii*," male, and "the spectre, or skeleton shrimp (*Caprella*)" ♂ and ♀. The *Orchestia* is evidently taken from Fritz Müller's Facts for Darwin, the *Caprella* from Bate and Westwood's *Caprella tuberculata*.

1884. Beltrémieux, Édouard.

Faune vivante de la Charente-Inférieure. Extr. des Ann. de la Soc. des Scienc. nat. de la Rochelle. 1884. pag. 29 et 30.

"Cite les cinq espèces suivantes: *Pherusa fucicola* Leach, *Talitrus gammarellus* Lam. (*Orch. littorea* Leach), *Talitrus saltator* Edw., *Corophium longicorne* Latr., *Hyperia Latreillii* Edw." (M. Chevreux in litt.)

1884. Blanc, Henri.

Die Amphipoden der Kieler Bucht nebst einer histologischen Darstellung der "Calceoli." Nova Acta der Ksl. Leop.-Carol. Deutschen Akademie der Naturforscher. Band XLVII. N^r. 2. Mit 5 Tafeln N^r VI–X. (*Eingegangen bei der Akademie den* 25 *Juni* 1883.) Halle. 1884.

According to Dr. Blanc the Amphipods of the Bay of Kiel forcibly illustrate the remark of Professor Möbius that the invertebrates of the Baltic are a degraded branch of the rich fauna of the North Atlantic and Arctic oceans.

The introduction discusses briefly the external structure, sexual differences, places of abode and length of life of Amphipods, and assigns their colouring to chromatophores in some species, and oil-drops in others, spread about in the body.

A special account of the "Calceoli" reviews the opinions of earlier writers upon them, describes their structure, and gives a preference to the view that they may be organs of hearing, rather than of clasping or smelling. The occurrence of the apparatus in the females as well as the males is urged against the suggestion that they are organs of clasping. In favour of Dr. Blanc's own view the circumstance is mentioned that the apparatus is met with in species which live in small depths, and that the number of the calceoli is greatest in those species which live on the surface, where enemies threaten most. The parts of the organ in question are the stem, the cup-shaped base with a central opening above carrying a circlet of very fine hairs, and, seated with its broader end in the cup, an ovoid bladder-like structure extremely thin-walled and marked with concentric stripes. Professor Blanc could not discover any termination of a nerve in the Calceolus or connection with the antennary-nerve, but a dark stripe within the stem he considers to be a sensory nerve-mass carrying the circlet of hairs. The so-called Riechzapfen (bâtonnets hyalins) he finds on the upper antennæ of both sexes of the Amphipoda, but Hoek's discovery of them on the lower antennæ of *Cheirocratus brevicornis* he is unable to corroborate.

Excellent figures and descriptions are given of the following species, with remarks of value upon them:—*Hyperia galba*, Montagu, found in late summer lodging in *Medusa aurita* and *Cyanea capitata*, commonly free in winter: *Orchestia littorea*, Montagu, with two forms of the male, on which light has since been thrown by Faxon's observations upon *Cambarus*; *Pontoporeia femorata*, Kröyer (with *Pontoporeia affinis*, Lindström, in the synonymy), and *Pontoporeia furcigera*, Bruzelius, which, however, should probably be named respectively *Pontoporeia affinis*, Lindstr., and *Pontoporeia femorata*, Kröyer (see Sars, Oversigt, p. 83, 1882); *Bathyporeia pilosa*, Lindström; *Dexamine spinosa*, Montagu; *Atylus bispinosus*, Sp. Bate, which Boeck calls *Halirages bispinosus*; *Calliopius læviusculus*, Kröyer; *Gammarus locusta*, Linné, found in almost fresh water as well as in salt water everywhere; *Cheirocratus brevicornis*, Hoek, the synonymy of which seems to be *Gammarus sunderallii*, Rathke, *Liljeborgia shetlandica*, Sp. Bate, *Protomedeia whitei*, Sp. Bate, *Liljeborgia normanni*, Stebbing, so that its proper designation is *Cheirocratus sunderallii*, Rathke; "*Amathilla Sabinii*," Leach; *Microdeutopus gryllotalpa*, Costa, referred in accordance with Heller to the family Corophidæ, subfamily Podocerinæ; *Amphithoë podoceroides*, Rathke; *Podocerus falcatus*, Montagu; *Corophium longicorne*, Fabricius; *Proto ventricosa*, Müller, and lastly *Caprella linearis*, Linné, including therein, in agreement with Hoek and contrary to the view of Mayer, *Caprella hystrix* and *Caprella acuminifera* of Sp. Bate.

1884. Blanc, Henri.

Contribution à l'histoire naturelle des Asellotes hétéropodes. Observations faites sur la Tanais Oerstedii, Kröyer. Avec les Planches X, XI et XII. Recueil zoologique Suisse (Dr Hermann Fol). Tome premier. No. 2. Sorti de presse le 28 février 1884. Genève-Bale. pp. 189–258.

Dr. Blanc agrees with Lilljeborg in referring the two species *Tanais rhynchites* and *Tanais balticus* of Fr. Müller, as respectively male and female forms, to the older *Tanais oerstedii*, Kröyer. The description which he proceeds to give bears on the disputed question, whether the Tanaidæ should be reckoned among the Amphipoda. In *Tanais oerstedii*, he says, the heart extends along the back from the last thoracic ring to the hinder rim of the cephalothorax. In this species, as in *Tanais savignii*, it possesses only two pairs of ostioles (venous orifices), whereas for *Tanais dubius?* Müller reckons three pairs, and Delage only one pair for *Tanais rittatus*. The ostioles are situated in the second and third free segments of the peræon. Besides these, the heart has five arteries, the cephalic artery and two abdominal arteries described by Delage, and in addition two thoracic arteries as large as the cephalic, arising, opposite one another, from the ventral part of the heart, below the two ostioles in the second free thoracic segment, and running a ventral course to the first thoracic feet.

In conclusion Professor Blanc says, "the characters which bring the Tanaidæ near to the Isopods are more numerous [than those which connect them with the Amphipoda and other groups]. The general form of the body is that of the Isopods. The body is flattened, the sixth and seventh segments of the pleon are, as in the Isopods, soldered together and form a caudal lamella, while in the Amphipods these two segments are distinct. The number of ganglia in the ventral chain of *Tanais Oerstedii* is the same as in certain Isopods, as Cymothoa, Ligidium; in the Amphipods the number is less considerable, the abdominal ganglia being reduced to four or three. The five pairs of abdominal feet, as in Anceus, are all alike; since they play a part in the act of respiration, they are not the biramous feet of Amphipods. In the latter group, the urinary secretion is situated in the antennary glands and the glandular appendages of the rectum [of the midgut, according to P. Mayer]; these glands are wanting in the Tanaidæ as in the Isopods, in which the urinary secretion is situated in the fatty body. Lastly, the absence of the seventh pair of feet in the embryos of the Tanaidæ and the Isopoda is an important character which distinguishes these Crustacea from the Amphipoda, of which the embryos are born with the same number of appendages as they have when adult."

One point in this argument loses some of its force from the fact that the sixth and seventh abdominal segments *are* occasionally soldered among the Amphipoda, in the tribe Hyperina. The absence of lateral arteries was considered by Delage to show a nearer connection of the Tanaidæ with the Amphipoda (Gammarina) than with the Isopoda, but this point of resemblance can no longer be relied on since Professor Blanc's discovery of the lateral arteries in *Tanais oerstedii*, nor yet on the other hand can the presence of these arteries be relied on as any special link between the Tanaidæ and Isopoda, since Claus finds lateral arteries in many genera of the Amphipoda (Hyperina).

Gerstaecker, 1886, is by no means convinced by Professor Blanc's arguments, and, as will be seen, retains his conviction that the Tanaidæ ought to be classed among the Amphipoda.

1884. Chevreux, Édouard.

Suite d'une liste des crustacés amphipodes et isopodes des environs du Croisic. Association française pour l'avancement des Sciences. Congrès de Blois. 1884.

Forty-four species of Amphipods are here enumerated in addition to the forty recorded by M. Chevreux in 1883. The actual number of distinct species in the list will be rather smaller, when allowance is made for the instances in which separate names have been given to the different sexes of the same species. This will be understood in most cases from the notes which M. Chevreux has appended.

1884. Chilton, Charles.

Additions to the Sessile-eyed Crustacea of New Zealand. (*Read before the Philosophical Institute of Canterbury*, November 15th, 1883.) The Transactions of the New Zealand Institute, 1883. Vol. XVI. Wellington, 1884. Art. 14. pp. 252–265. Pls. XVII.–XXI.

Of a whale-louse, found on *Euphysetes potsii*, a species said to be "identical with *Viayia breviceps* of the northern hemisphere," Mr. Chilton writes, "I can find no important character by which these specimens can be distinguished from *Cyamus ceti*, as described and figured by Bate and Westwood. The penultimate joints of the last three pairs of legs are not quite so stout as shown in their figure, but this is evidently a character liable to variation according to age, etc. The young taken from the pouch of the female closely resemble those figured by Bate and Westwood on page 90."

Wyrillea longimanus, Haswell, is identified by Mr. Chilton with *Podocerus cylindricus*, Kirk, and renamed *Podocerus longimanus*, figured pl. xvii. fig. 2, in regard to which see Note on Haswell, 1880.

A new genus, *Teraticum*, is thus defined:—"Body small. Eyes two. Coxæ of first four segments as deep as their respective segments. Antennæ with short flagella; upper antenna with a small secondary appendage. Mandible with an appendage. First gnathopod larger than the second, subchelate; second slender, chelate. Posterior pair of pleopoda uniramous. Telson single, undivided." This must, I think, yield to *Seba* of A. Costa. The type species, *Teraticum typicum*, seems to be identical with "*Seba Saundersii*," Stebbing.

A new genus, *Paranænia*, is thus defined:—"Antennæ subequal, superior with a secondary appendage, both with multiarticulate flagella. Appendage of mandible with three broad setose joints, as in *Podocerus*. Maxillipedes with well-developed plates on ischios and meros. Gnathopoda subchelate, first small in both sexes, second small in female, very large in male. Last pair of pleopoda biramous, rami styliform. Telson single, ending posteriorly in two conical projections." This genus was instituted to receive *Paranænia typica*, n. sp. pl. xix. fig. 1, *Paranænia longimanus*, n. s., pl. xx. fig. 2, and *Mæra dentifera*, Haswell, pl. xxi. fig. 2. Of these the first and third have the coxæ of the third peræon-segment in the males "large, and produced along the inferior edge of the second segment." In the females and in the other species the coxæ are normal. In describing the genus *Gammaropsis*, Lilljeborg, Boeck does not choose the same characters as those used by Mr. Chilton, but when the description of Boeck's *Gammaropsis erythrophthalmus* (*melanops*, G. O. Sars) is added to that of the genus, and in like manner Mr. Chilton's specific descriptions are added to that of his genus, it becomes, I think, clear that *Paranænia* cannot be separated from *Gammaropsis*.

The mouth-organs and pleon seem to be in minute agreement, while the antennæ and gnathopods have a full generic correspondence.

Corophium lendenfeldi, n. sp., pl. xx. fig. 1, is next described. This, however, cannot stand in the genus *Corophium*, since it has a secondary appendage on the upper antennæ, the first gnathopods are not subchelate, the second gnathopods are without the characteristic prolongation of the third joint, and the third uropods are biramous. The species is, moreover, now recognised as identical with *Gammarus barbimanus*, G. M. Thomson, 1879, which no doubt belongs to Haswell's genus *Haplocheira*. *Panoplæa translucens* n. s., pl. xxi. fig. 3, is next described, as closely related to, and taken in company with, *Panoplæa debilis*, Thomson, for which see Note on Thomson, 1880.

The new genus *Birenna* is thus defined:—"Body broad, coxæ very shallow. Antennæ subequal, upper without a secondary appendage. Mandibles without an appendage. Maxillipedes with well-developed plates on both basos and ischios. Gnathopoda equal, not subchelate. Last segment of pleon and its appendages rudimentary. Telson simple, not divided." The type species is *Birenna fulvus*, n. s., pl. xxi. fig. 1 (*Birenna fulva* at p. 265). Mr. Chilton thinks it may come near to *Phlias*, but he is very uncertain.

1884. CHILTON, CHARLES.

Notes on a few Australian Edriophthalmata. Extracted from Vol. IX., Part 4, of the "Proceedings of the Linnean Society of New South Wales." 10 pp. Pl. 46. 47. 1884.

In this paper Mr. Chilton proposes the specific name "*Coogeensis*" for a variety of *Allorchestes crassicornis*, Haswell, pl. 46. fig. 1., but this variety according to Haswell is not *Allorchestes crassicornis*, but the female of *Talorchestia quadrimana*, Dana. He describes *Glycerina affinis*, n. s., pl. 47. fig. 1., which "closely resembles *G. tenuicornis*, Haswell"; *Mœra festiva*, n. s., pl. 46. fig. 2., which, according to Mr. Haswell, belongs to *Mœra rubromaculata*; gives notes on *Megamœra* (*Mœra*) *subcarinata*, Haswell, to which he finds that *Mœra petriei*, Thomson, is a synonym, and on *Amphithoë setosa*, Haswell; discusses the relations of *Microdeuteropus mortoni*, Haswell, *Microdeuteropus tenuipes*, Haswell, *Microdeuteropus maculatus*, Thomson, with one another and with *Aora typica*, and suggests the possibility that *Paramœnia typica*, Chilton, is the same as *Mœra approximans*, Haswell.

Mr. Chilton further suggests that the genera *Aora* and *Microdeuteropus* will eventually have to be combined.

He transfers *Montagua miersii*, Haswell, which he had previously renamed *Montaguana miersii*, to Costa's genus *Probolium*, but without saying whether it has or has not mandibular palps, so that it remains uncertain whether it should be placed in the genus *Stenothoë*, Dana, of which Costa's *Probolium* is a synonym, or in *Metopa*, Boeck.

1884. CHILTON, CHARLES.

The distribution of terrestrial Crustacea. The New Zealand Journal of Science. Vol. II. No. 4. Dunedin, N. Z. July, 1884. pp. 154–157.

Arguing that similar variations may arise independently, where animals of the same family are separately subjected to new but similar conditions of life, Mr. Chilton says, "We know that this is true to a certain extent at any rate, for the terrestrial Amphipoda and Isopoda have without doubt arisen independently, and yet in both the inner antennæ have become very small—rudimentary in the Isopoda, nearly so in Amphipoda,—and in both the mandible

has lost its palp." He also remarks that "the Amphipoda appear to be only now developing terrestrial forms, and a splendid series could be made out of existing species, from *Nicea*, living wholly in the water, through *Allorchestes*, etc., which live in rock-pools, but can walk and live (leap, MS. correction) on land with great agility, *Talorchestia*, etc., living just above high-water mark, and only occasionally splashed with salt water, to species of *Orchestia* and *Talitrus*, such as *O. Sylvicola*, which live far away from the sea."

1884. Chilton, Charles.

The New Zealand Journal of Science. Vol. II. No. 5. September 1884. p. 230.

This note identifies *Mœra petriei*, G. M. Thomson, with *Megamœra* (*Mœra*) *subcarinata*, Haswell, the latter name having the priority.

1884. Claus, C.

Elementary Text-book of Zoology. General part and special part; Protozoa to Insecta. By Dr C. Claus. Translated and edited by Adam Sedgwick, M.A., with the assistance of F. G. Heathcote, B.A. London, 1884.

At page 405, the Arthropoda are defined as "*Laterally symmetrical animals with heteronomously segmented body and jointed segmental appendages; with brain (supræsophageal ganglia) and ventral nerve cord (ganglionic chain).*"

At page 411, Class I.—Crustacea are defined as "*Aquatic Arthropoda, which breathe by means of gills. They have two pairs of antennæ; numerous paired legs on the thorax, and usually also on the abdomen.*" It is observed that "some forms, however, can live on land, and possess respiratory organs adapted for breathing air." "The mandibles are simple but very rigid and hard masticating plates, which are usually toothed and correspond morphologically to the coxal joint of a limb, the following joints developing into a palp-like appendage (*mandibular-palp*)." "The delicate hairs and filaments of the anterior antenna are probably *olfactory organs*." "The so-called shell glands of the lower *Crustacea* are regarded as urinary organs, as are also the glands opening at the base of the posterior antenna in the *Malacostraca*. In the *Entomostraca* the latter are only preserved during larval life. Short tubes, which correspond to the Malpighian tubes of the Tracheata, may also be present on the rectum (*Amphipoda*)." [This correspondence, however, is denied by P. Mayer, 1882, and W. B. Spencer, 1885.]

The Crustacea are divided into four groups, Entomostraca, Malacostraca ("the higher *Crustacea* characterised by a definite number of segments and appendages"), Leptostraca (for *Nebalia*), and Gigantostraca. The Malacostraca include the two orders, Arthrostraca (*Amphipoda and Isopoda*), and Thoracostraca.

At page 449, the Arthrocostraca are defined as "*Malacostraca with lateral sessile eyes, usually with seven, more rarely with six or fewer separate thoracic segments, and the same number of pairs of legs. Without a reduplicature of the skin.*" "The head bears four antennæ, the two mandibles, four maxillæ, and a pair of maxillipeds; in all six pairs of appendages. A small bilobed plate, distinguished as the underlip, behind the pair of mandibles, marks the boundary of the *primary* region of the head. The two pairs of maxillæ as well as the maxillipeds are secondary cephalic appendages derived from the thoracic region of the body." I do not know how this last statement is to be reconciled with the previous

description of the Malacostraca, p. 447, "the head includes in all cases, behind the mandibular segment on which two paragnathi form a kind of underlip, the segments of two pairs of maxillæ. The latter preserve more or less the character of phyllopod feet. The head, therefore, consists of five segments, each with its pair of appendages, viz., two pairs of antennæ, one pair of mandibles, and two pairs of maxillæ. It is followed by the thorax, which is composed of eight segments." It may be noticed also that the eyes in some Amphipoda can scarcely be called lateral, and in others are apparently altogether wanting; nor is it quite accurate to say (p. 450) that "the two eyes are always sessile, compound," since in *Ampelisca* they are simple.

At p. 451 the suborder Amphipoda are thus defined:—"*Arthrostraca with laterally compressed body, with gills on the thoracic feet and an elongated abdomen, of which the three anterior segments bear the swimming feet, while the three posterior bear posteriorly directed feet adapted for springing.*"

The plates forming the brood-pouch are here called *oostegites*. "The eggs pass into the brood-pouch and there develop. The yolk sometimes (*G. locusta* and other marine species) undergoes a complete segmentation. Sometimes (*G. pulex*), after a superficial segmentation, a peripheral cell-layer is separated, which develops into a delicate blastoderm beneath the egg membrane. A ventral primitive streak is then formed, and on the dorsal side, beneath a differentiation which has been erroneously taken for a micropyle, a peculiar globular organ makes its appearance; this is the first rudiment of the cervical gland (*dorsal organ*), which is confined to embryonic life. The appendages are developed from before backwards on the ventrally flexed body of the embryo. The young animals usually possess at hatching all their appendages and in all essential points have the structure of the adult animal, but the number of joints of the antennæ and the special form of the legs still present differences. In the *Hyperina* alone the just hatched young may be without abdominal feet, and differ so much in their form from the adult that they may be said to undergo a metamorphosis." The following classification is made:—

"*Tribe* 1.—Læmodipoda. *Amphipoda with cervically placed anterior legs and rudimentary apodal abdomen.*" "The abdomen is small and reduced to a short protuberance destitute of appendages." This statement requires modification. *Caprella linearis*, L., and *Cyamus ceti*, L., are given as examples.

"*Tribe* 2.—Crevettina. *Amphipoda with small head, small eyes, and multiarticulate pediform maxillipeds.*" "The coxal joints of the thoracic legs have the form of broad and large epimeral plates. The abdomen has always the full number of segments. The three posterior pairs of abdominal feet (*uropoda*) are well developed and often much elongated." The *epimeral* plates, however, are not always large, nor are all the uropoda always well developed. Three families are assigned to the Crevettina: the Corophiidæ, in which "the coxal joints of the legs are frequently very small"; the Orchestiidæ, and the Gammaridæ.

"*Tribe* 3.—Hyperina. *Amphipoda with large swollen head and large eyes, usually divided into frontal and lateral eyes. They have a pair of rudimentary maxillipeds functioning as underlip.*

"The antennæ are sometimes short and rudimentary, sometimes of considerable size, and in the male are elongated into a multiarticulate flagellum (*Hyperidæ*). The posterior antennæ may in the female be reduced to the basal joint enclosing the glandular tube (*Phronima*); in the male, on the contrary, they are folded in a zigzag, after the manner of a carpenter's rule (*Platyscelinæ*). A paired auditory vesicle may be present above the brain (*Oxycephalus*, *Rhabdosoma*)." Three families are assigned to this group, the Hyperidæ, the Phronimidæ and Platyscelidæ. In the description of the family Phronimidæ, the statement "Head large, with projecting rostrum and large divided eye" should rather be "Head large, with projecting snout or muzzle and large pair of divided eyes."

The parenthetic statement, on p. 453, that "the presence of Arctic species [of Amphipoda] in the Swedish and Norwegian seas is very interesting," loses its point by the introduction of the word "seas" through an oversight instead of "lakes."

The Isopoda are divided into two tribes, Anisopoda and Euisopoda. The Anisopoda are thus defined:—"*Body more or less resembling that of an Amphipod. The abdomen with biramous swimming feet* (Tanais), *which do not function as gills, or with fin-like feet* (Aneeus)."

In the "General Part" of the volume, valuable information is to be found under various headings, in regard to organs of vision, nerves, &c.

1884. D'URBAN, W. S. M.

Crustacea on the South Coast of Devon. The Zoologist. Ser. 3. Vol. VIII. London, 1884. pp. 151–153.

The capture of half a dozen species of Amphipods, not new ones, is recorded.

1884. FAXON, WALTER.

On the so-called Dimorphism in the genus *Cambarus*. From the American Journal of Science, Vol. XXVII. January 1884. pp. 42–44.

"It appears probable that the two forms of the crayfish are alternating periods in the life of the individual, the 'first form' being assumed during the pairing season, the 'second form' during the intervals between the pairing seasons." Mr. Faxon suggests that this curious discovery may explain the existence of two forms of the male in the genera *Tanais* and *Orchestia* pointed out by Fritz Müller (Für Darwin). It is obvious that, if the phenomenon in question should prove to be of frequent occurrence among the Crustacea, it may make necessary an extended revision of specific names.

1884. HOEK, P. P. C.

Schaaldieren van de Oosterschelde. Crustacés de l'Escaut de l'Est. Overdruk uit: Tijdschr. Ned. Dierk. Vereen., Supplementdeel I. Afl. 2. 1884. 31 pages.

This paper, in Dutch and French, records from the locality mentioned in the title fifteen species of Amphipoda, none of them new. Among them was *Atylus vedlomensis*, Bate and Westwood; (also recorded from Guernsey, see Note on Koehler, 1885).

1884. KINGSLEY, JOHN STERLING.

The Standard Natural History. Vol. II. Crustacea and Insects. Boston, 1884.

Crustacea are Class I. of the Arthropoda. The Edriophthalmia are Subclass IV. of the Crustacea, and embrace two orders, Isopoda and Amphipoda. The Amphipoda, pages 72–77, include two suborders, Læmodipoda and Amphipoda genuina. The families assigned to the first suborder are the Caprellidæ and Cyamidæ, to the second, the Oxycephalidæ, Phronimidæ, Hyperidæ, Cheluridæ, Corophidæ, Gammaridæ, Orchestidæ.

Species are figured under the following names, but without names of the authors of the species; fig. 96. *Caprella geometrica;* fig. 97. *Cyamus ceti;* fig. 98. *Rhabdosoma batei;* fig. 99.

Thaumops pellucida; fig. 100. *Hyperia*; fig. 101. *Cystosoma neptuni*; fig. 102. *Ceraptus rubricornis*; fig. 103. *Unciola irrorata*; fig. 104. *Gammarus ornatus*; fig. 105. *Orchestia agilis*, beach-flea; fig. 106. *Amphithoë maculata*.

Among the miscellaneous remarks it is observed that "*Unciola* does not build a tube, but takes any that it may find vacant." According to S. I. Smith's account, in 1880, "the animal apparently does not construct tubes for itself, though often found in the tubes of other Amphipoda, and in the tubes of Annelida. In the Bay of Fundy," he says, "I have found it abundantly in small holes in sandy mud near low-water mark."

1884. MARTENS, EDUARD VON.

Crustacea. The Zoological Record for 1883; being Volume twentieth of the Record of Zoological Literature. London, M.DCCC.LXXXIV. pp. 1–34.

1884. MIERS, E. J.

Report on the Zoological Collections made in the Indo-Pacific Ocean during the Voyage of H.M.S. 'Alert,' 1881–2. London, 1884.

A brief review is given of earlier writings dealing with the Crustaceans of Australia. "In regard to the Amphipoda," Mr. Miers says, "the affinity of the Australian with the European fauna is very remarkable; and among the few species included in the present Report instances (*Leucothoë spinicarpa*, *Caprella æquilibra*) occur where I have identified Australian examples with well-known European types, while in several other instances, the distinctions are so slight as to be scarcely of specific importance; hence I must qualify the opinion I formerly expressed as to the improbability of the species of such widely distant regions ever being actually identical."

In the determination of the Amphipoda, pages 311–321, 567–569, Mr. Miers has used Spence Bate's classification rather than Boeck's, presuming that Boeck's, being concerned with North Temperate and Arctic, would not without much modification suit the southern fauna. *Ephippiphora kröyeri*, White, which Boeck doubtfully referred to his genus *Socarnes*, is here upheld. "In the specimens from the 'Alert' collection the terminal segment is elongated, narrowing slightly to the distal extremity, with the sides straight, and is divided by a narrow median fissure." White's type specimens from Tasmania are unfortunately dry and broken, so that his species must apparently remain in some obscurity, but the imperfect terminal segments seem, Mr. Miers says, to show a structure like that of the "Alert" specimens, differing in this particular from *Lysianassa nitens*, Haswell. *Lysianassa australiensis*, Haswell, is said to come very near to *Ephippiphora kröyeri*, but to be probably distinguished from it by the telson, which Haswell leaves undescribed, as though similar to that of *Lysianassa nitens*. Mr. G. M. Thomson recorded the species from New Zealand, as "*Lysianassa Kröyeri*," but without describing the telson, so that Mr. Miers could not express an opinion on its identity. To judge by a specimen which Mr. Thomson has sent me, the New Zealand form must be quite distinct, since its telson is neither elongate, nor divided. Mr. Haswell in 1886 explains that the telson in his *Lysianassa nitens* is not, as he at first thought, simple, but deeply cleft, and in *Lysianassa australiensis* also "the telson is cleft to the base." *Leucothoë commensalis*, Haswell, is regarded as at most a variety of *Leucothoë spinicarpa*, Abildgaard, and in this Mr. Haswell appears to acquiesce. Kossmann's *Leucothoë crassimana* from the Red Sea is thought to be another synonym of the same species. A new species, *Leucothoë brevidigitata*, pl. 34. fig. A., is figured and described, which, it is said, may be regarded as in some sense intermediate between *Leucothoë noræ-*

hollandiæ, Haswell, on the one hand, and, on the other, *Leucothoë commensalis* with the closely allied species or varieties *Leucothoë diemenensis*, Haswell, and *Leucothoë gracilis*, Haswell. *Melita australis*, Haswell, is said to be very nearly allied to the *Melita setipes*, Dana, from Singapore. Additional particulars are given to supplement the original description by Haswell of *Mœra ramsayi*, but that species is now recognised by Mr. Haswell as a synonym of *Mœra rubromaculata*, Stimpson, which is also here described, but from imperfect specimens. A specimen, from which the head was wanting, is described under the provisional name of *Mœra crassimana*. Another imperfect specimen is described, but not named. "In the form of the anterior legs and in the coloration it resembles *Amphithoë setosa*, Haswell, from Botany Bay, but differs in the form of the palm of the second leg, and, I suppose, of the posterior uropoda." *Megamœra suensis*, Haswell?, is very fully described, and this description Mr. Haswell accepts as applying to the ordinary form of his species, so that Mr. Miers' alternative name, *Megamœra haswelli*, is not needed. *Megamœra thomsoni*, pl. 34. fig. B., is described and figured as a new species, though near to, and possibly only a variety of, *Megamœra semiserrata*, Sp. Bate, or *Megamœra brevicaudata*, Sp. Bate, which are British species. Its points of distinction from *Megamœra mastersii*, Haswell, are pointed out, but nevertheless Mr. Haswell in his latest revision considers it a synonym of that species. *Podocerus australis*, Haswell, is briefly discussed. Notes are given upon *Caprella æquilibra*, Say, and a specimen, pl. 34. fig. C., is doubtfully referred to *Caprella attenuata*, Dana, of which Mr. Haswell has since observed, "the species figured by Miers is very different from the adult *C. attenuata*, but may be an immature form."

From the Seychelles a new species is described (p. 567) and figured under the name *Mœra diversimanus*, pl. 52, fig. D. It is compared with *Mœra truncatipes* (Spinola) from the Mediterranean, and with *Mœra ramsayi*, Haswell, already noticed, and it is suggested as possible that more specimens might offer transitional characters serving to unite the two forms.

1884. Schneider, J. Sparre.

Undersøgelser af dyrelivet i de arktiske fjorde. II. Crustacea og Pycnogonida indsamlede i Kvænangsfjorden 1881. (Aftryk af Tromsø Museums aarshefter VII.) Tromsø. 1884. pp. 56–134. Pl. I–V.

A new species is figured (Tab. I. & II.) and described under the title *Menigrates* (*Orchomene?*) *arcticus*. Complaint is made, as has been done by several authors, of the minute and over subtle distinctions on which Boeck has founded some of his numerous genera in his subfamily Lysianassinæ, the result often being, as in this instance, that the author of a new species cannot decide in which of the genera he ought to place it. Another new species, *Metopa sólsbergi* (Tab. III. & IV.), here figured and described, is said to be akin to *Metopa longicornis*, A. Boeck. A species described and figured in 1883 as *Monoculodes norvegicus* is here separated from that species and recognised as a new one under the name *Monoculodes tessellatus*, Schneider, agreeing in part with *Œdiceros affinis*, Goës, the last-named author being supposed to have confused two species together, one of them being *Monoculodes tessellatus*, the other *Monoculodes borealis*, A. Boeck.

Besides the description of new species, many important observations are given in regard to species already known. Among others, *Pardalisca cuspidata*, Krøyer, is discussed. Schneider, comparing his own drawings with Boeck's, finds that the maxillipeds differ somewhat, and that the second maxillæ assigned in Boeck's plate to *Pardalisca* in fact belong to *Syrrhoë crenulata*. In some points he finds that his drawings correspond far better with Boeck's description of *Pardalisca abyssi* than with that of *Pardalisca cuspidata*. In the full

description which follows, however, Schneider describes the finger of the gnathopods as oval, which will not suit *Pardalisca abyssi*, Boeck. He then speaks of the finger being two-jointed, inasmuch as it possesses a curved nail, which is obviously movable, thus making the number of joints to the limb in all seven. It may however be questioned whether this nail is anything more than a (possibly) movable spine. Were Buchholz and Schneider both right in their views as to the gnathopods of *Pardalisca cuspidata*, these limbs would have eight joints instead of the usual six.

A single damaged example of a *Melphidippa* is referred provisionally to *Melphidippa borealis*, Boeck. Figures (Tab. V.) and as full a description as circumstances would permit are given of it.

In the account of *Ampelisca eschrichtii*, Krøyer, notice is taken of the spine-bearing incision in the side of the outer branch of the second uropods, and the author remarks that he has found this peculiarity also in several species of *Onesimus*, *Tryphosa*, *Socarnes* and *Anonyx*. It occurs also in *Ichnopus*. The objection to Boeck's description of *Hippomedon holbøllii*, Krøyer, that it makes the hand of the first gnathopod longer than the wrist, instead of the reverse, does not apply to the Latin account, and the error is evidently due only to the accidental omission of a word in the printing.

1884. Smith, S. I.

Crustacea of the "Albatross" Dredgings in 1883. American Journal of Science, July, 1884, pp. 53–56. Annals and Magazine of Natural History. Ser. 5. Vol. XIV. London, 1884. pp. 179–183.

He records the capture of *Eurytenes gryllus*, Mandt, over 4½ inches long, in deep water off the middle Atlantic Coast of the United States, thus explaining the apparent anomaly of "its occurrence in the extreme arctic and antarctic seas" discussed by Lilljeborg.

1885. Aurivillius, Carl Wilhelm Samuel, born August 31, 1854 (C. W. S. A.).

Krustaceer hos Arktiska Tunikater. Härtill tre taflor. [Ur Dvega-expeditionens vetenskapliga iakttagelser, Bd. IV. Stockholm, 1885.] pp. 223–254.

Andania pectinata, Sars, 1882, is described and figured (Taf. 7, figs. 1–12). Of the four characters by which Boeck distinguishes *Andania* from *Stegocephalus*, Aurivillius observes that this species has only two. In regard to the two-jointed palp of the first maxillæ, and the undivided telson, it agrees with Boeck's description of *Andania*, but in regard to the mandibles and the palp of the second maxillæ it agrees with *Stegocephalus*. Unless a new genus were formed to receive it, Aurivillius inclines to leave it in the genus *Andania*, but its mandibles, in my opinion, decisively separate it from *Andania*, and assign it at any rate provisionally to *Stegocephalus*.

Variations are noticed in specimens of "*Aristias tumidus* Krøyer," from different localities.

1885. Bovallius, Carl.

On some forgotten genera among the Amphipodous Crustacea. With one plate. Communicated to the Roy. Swedish Academy of Science, February 1885. Stockholm, 1885. Bihang till K. Svenska Vet.-akad. Handlingar. Band 10. N:o 14.

In this acute and ingenious paper Bovallius vindicates the genus *Lanceola*, Say, 1818, as distinct from *Hyperia*, Latreille, and *Vibilia*, Milne-Edwards, and gives preliminary descriptions of the

following new species, "*Lanceola Loréni*," "*Lanceola Sayana*" (Fig. 1. 1*a* and 1*b*.), *Lanceola felina*, *Lanceola serrata*, *Lanceola curticeps*, "*Lanceola Clausii*." He considers that the genus *Daira*, Milne-Edwards, 1830, is either identical with or very near to *Paraphronima*, Claus, and that *Dairinia*, Dana, is quite distinct, synonymous with *Thamyris*, Spence Bate, and belonging to Claus' family Lycæidæ. *Dairinia* [or rather *Dairilia*] was substituted by Dana for *Daira*, the latter being preoccupied. Bovallius describes the new species *Paraphronima clypeata* (Fig. 2), *Paraphronima californica*, "*Paraphronima Edwardsii*," and, for the sake of comparison, *Paraphronima gracilis*, Claus, and *Paraphronima crassipes*, Claus. He argues that *Tyro*, Milne-Edwards, 1840, is the same as *Clydonia*, Dana, which the latter author placed among the Corophidæ instead of the Hyperidæ. It may be noted that G. O. Sars had already, in 1882, transferred *Clydonia* to the Hyperidæ, but without recognising its identity with *Tyro*. Bovallius gives preliminary descriptions of the new species, "*Tyro Clausii*," *Tyro atlantica*, *Tyro marginata*, "*Tyro Sarsii*" (Fig. 3 and 3*a*), "*Tyro Tullbergii*." Lastly he upholds the genus *Tauria*, Dana, 1853, as distinct both from *Hyperia*, Latreille, and *Metoecus*, Krøyer; he gives figures copied from Dana of the type species, *Tauria macrocephala*, and concludes with the following observation:—"The Tauria medusarum O. Fabr. [A. Boeck] is to be united with the genus Hyperia, because the development of the carpal process is gradual through the species and no generic character. But as the name H. medusarum has been already given by O. F. Müller to another Hyperia, I propose for it the name *Hyperia Kroeyeri*, the diagnosis being the same as that given by Boeck l. c. pag. 83. Tauria abyssorum, A. Boeck, must be named Hyperia abyssorum, A. Boeck." As already observed, if G. O. Sars is right in identifying *Tauria abyssorum*, Boeck, with *Tauria medusarum*, Boeck, then *Hyperia abyssorum* will take precedence of Bovallius's *Hyperia kroeyeri*. The remark is scarcely accurate that Spence Bate "has been deceived into transferring Hyperids with totally opposite characters to Dana's genus," since *Hyperia tauriformis*, Bate and Westwood, the species referred to, is not transferred to Dana's genus at all, but I think that Bovallius is justified in dropping the specific name *tauriformis* on the ground of its misleading character, though otherwise (see Note on Norman, 1869, in Appendix) it would take precedence of the name *kroeyeri* which Bovallius proposes, as well as of Boeck's *abyssorum*.

1885. Bovallius, Carl.

Mimonectes, a remarkable genus of Amphipoda Hyperidea. With 3 Plates. (Presented to the Royal Society of Sciences of Upsala the 10th October 1885.) Upsala, 1885.

The name refers to the "mimicry" presented by these Amphipods; the creature offering "a striking resemblance to a little jelly-fish." A new family is constituted as follows:—"Mimonectidæ. Hyperids with the head and a part or the whole of the pereion developed into an enormous balloon-shaped globe. Ocelli not united but dispersed on each side of the head. The upper antennæ long, more or less straight. The lower small, four-jointed. The mandibles without palp. The maxillipeds well developed."

The new genus *Mimonectes* is thus defined;—"*Caput* magnum, latum, valde inflatum, simul eum pereio sphæram formans. *Oculi* parvi, dispersi. *Antennæ superiores* longæ, rectæ, flagello articulato. *Antennæ inferiores* parvæ. *Pleon* compressum non inflatum. *Pedes uri* duos ramos gerentes." "The genus Mimonectes is easily distinguished from other Hyperids by its globular shape, with all the legs, branchial sacks, ovigerous lamellæ, and the urus hanging down, similar to the filaments of a Medusa. But it differs also by some anatomical and morphological characteristics from all or most of the other Hyperids.

As important points I mention the structure of the eyes and of the nervous system, and that the interior of the pereion forms a bladder containing a fluid. With the genus *Lanceola*, Say, it agrees in the strong development of the maxillipeds, with *Cysteosoma*, Guérin, and *Tyro*, Milne-Edwards, in the form of the upper antennæ, with the true Hyperiæ in the shape of the urus and its appendages."

The type species, "*Mimonectes Lovéni*," is very minutely described. The two other new species are called *Mimonectes sphæricus* and "*Mimonectes Steenstrupii*." They all three come from the Atlantic, and give the impression of being specifically very closely allied. The fact that the bell or globe in the first and largest is formed by five segments, in the second by six, and in the third and smallest by seven segments of the peræon, though producing a striking difference to the eye, may well be due to age or sex, and would naturally carry with it some differences in the proportions of other parts of the animal.

1885. Carrière, Just.

Die Sehorgane der Thiere vergleichend-anatomisch dargestellt. München & Leipzig.

According to the Zool. Jahresbericht für 1885, this paper discusses among others the eyes of *Gammarus*, *Hyperia*, and *Phronima*.

1885. Carus, Julius Victor.

Prodromus Faunæ Mediterraneæ sive Descriptio Animalium Maris Mediterranei incolarum quam comparata silva rerum quatenus innotuit adjectis locis et nominibus vulgaribus eorumque auctoribus in commodum Zoologorum congessit Julius Victor Carus. Vol. I. Pars II. Arthropoda. Stuttgart, 1885.

Pages 386 to 428 embrace the Amphipoda. These are classified as follows:—

"1. Tribus. *Laemodipoda*. 1. Fam. Caprellidæ. 2. Fam. Cyamidæ.

"2. Tribus. *Crevettina*. 1. Fam. Duchilidæ. 2. Fam. Cheluridæ. 3. Fam. Corophiidæ. 4. Fam. Orchestiidæ. 5. Fam. Gammaridæ.

"3. Tribus. *Hyperina*. 1. Fam. Vibiliidæ. 2. Fam. Hyperidæ. 3. Fam. Phronimidæ. 4. Fam. Platyscelidæ."

It does not seem consistent, in the definition of the Læmodipoda to give "abdomen rudimentare absque appendicibus," and to follow this by a definition of *Proto*, including "*abdomen triarticulatum, pedum paribus duobus biarticulatis rudimentaribus*." The epithet *triarticulatum* is not in agreement with Mayer's account of *Proto*, "die Anhänge des eingliedrigen Abdomens sind in beiden Geschlechtern 2 Paare zweigliedriger Fuss-stummel."

Caprella grandimana, Mayer, is here made a synonym of "*Caprella Dohrni*," Heller. *Cyamus erraticus*, Roussel de Vauzème, is given as a synonym of *Cyamus ceti*, contrary to Lütken's view. The genus *Cyamus* is attributed to Lamarck, instead of Latreille, the actual author.

In the "Subfam. *Corophinæ* (Dana) Cls.," are given "*Cratippus pusillus* Heil. (*Colomastix pusilla* Grube)," and *Cratippus crassimanus*, Heller, but *Colomastix*, Grube, has priority over *Cratippus*, Sp. Bate. To *Corophium acherusicum*, A. Costa, is attached the synonym, "*? C. crassicorne* Bruz." To *Corophium crassicorne*, Bruzelius, is attached the synonym "*C. Bonellii* Sp. B. et W., ♀." In the "Subfam. *Podocerinæ* Cls.," to the genus *Cerapus*, Say, "*Erichthonius* et *Cerapodina* M.-Edw., *Pyctilus* Dana," are given as synonyms, but the definition does not

say whether the second uropods are biramous or uniramous. *Erichthonius bidens*, A. Costa, is named *Cerapus bidens*, V. Crs. (nec Czern.). Of *Pyctilus macrodactylus*, Dana, and *Pyctilus pugnax*, Dana, referred to *Cerapus* by Czerniavski, Carus remarks, "Hæ species duæ maris orientalis (insulæ Sulu) a Czerniawski in Ponto Euxino repertæ forsan etiam in Mediterraneo occurrunt." *Elasmopus rapax*, A. Costa, is here named *Podocerus rapax*, V. Crs. *Grubia*, Czern., is placed between *Podocerus* and *Amphithoe*. "*Amphithoe Salenskii*," V. Crs., is thus described:—"Caput rotundatum, sine rostro; antennæ I. inferioribus duplo longiores, stipite biarticulato et flagello 16-articulato, antennæ II. stipite triarticulato, flagello 5–6-articulato; dorsum leviter rotundatum, absque spinis; oculi fere orbiculares; pedes I. secundis multo robustiores, ungue magno terminati; pedes VII. omnium longissimi; pedum caudalium paria tria anteriora multo longiora; telson triangulare. Habit.: Napoli (Salensky)." By the biarticulate stipes of the upper antennæ it is presumably meant that the third joint of the peduncle is indistinguishable in size from the succeeding joints of the flagellum. The first gnathopods stouter than the second, and the elongate fifth peræopods seem to point in the direction rather of *Microdeutopus* than of *Amphithoë*, but nothing is said of a secondary flagellum.

In the family Orchestidæ, Dana, *Allorchestes*, Dana, is given, with *Hyale*, Rathke, for a synonym, and thus defined, "*Antennæ I. æque longæ ac stipes inferiorum, articulis basalibus imperfecte cum fronte connatis; spina olfactoria rudimentaris; mandibulæ palpo carentes; maxillipedes uncino terminali acuminato; pedes I. et II. subcheliformes.*" The tenth species assigned to this genus is *? Allorchestes punctatus*, Sp. B. (*Euone punctata*, Risso). Risso's definition of his genus is quoted. The name should be *Euone*, not *Euone*. This is followed by "*Nicea* Nicolet (*Hyale* Rthke., *Amphithoe* M.-Edw. p., *Allorchestes* Dana p.). *Antennæ I. et II. subæquales, vix capite longiores; telson profunde divisum (aut duplex?); pedes paris I. et II. subchelati; reliquæ notæ uti in Allorcheste.*" Thirteen species are assigned to *Nicea*, ending with "*N. pontica* Catta (*Hyale pontica* Rthke.)"

In the family Gammaridæ (M.-Edw.), Sp. B., "subfam. Atylinæ Cls.," to *Pherusa*, Leach, is given the synonymy, "*Amphithoe* M.-Edw., *Titanethes* Schiödte, *Paramphithoe* Bruz. p." *Titanethes*, Schiödte, however, is the name of an Isopod, given in place of *Pherusa*, Koch, preoccupied. *Probolium*, A. Costa, is retained, with five species, but as the definition given of it includes "mandibulæ sine palpo," this suffices to show that the species in question, *polyprion*, Costa, *marina*, Sp. Bate, *longimana*, Sp. Bate, *megacheles*, Heller, *tergestina*, Nebeski, belong to *Stenothoë*, Dana, if in each case the character of the mandibles has been ascertained. The third of these species is entered as "*Pr. longimanum* V. Crs. (*Montagua longimana* Sp. B.)." *Amphitonotus*, Costa, is given, with *Tritropis*, Boeck, for a synonym. Among the species is included "*A. Bobretzkii* Catta. Nondum descripta. (Corpus omnino inerme.) Habit.: Marseille, Calangue de Podesta (Catta)."

In the second subfam. Ampeliscinæ, Lilljeb. (Sp. B.), "*A. Gaimardi* Kr.," has the synonyms, "*Tetromatus typicus* Sp. B., *Araneops diadema* Costa, *Byblis Gaimardi* Boeck." "*A. brevicornis* Marion," has the synonyms "*Araneops brevicornis* A. Costa, *A. Belliana* Sp. B., *A. lævigata* Lilljeb."

In the third subfam. Leucothoinæ, Dana, under *Leucothoe*, Leach, is given as the second species, "*L. Richiardii* Lessona. A L. furina differt pari ultimo pedum spuriorum projiciente uti in L. furina, sed in chelam bidigitalem terminato. Thorax, antennæ et par pedum chelatum rubra, abdomen maculis rubris. Habit.: Genova, sinus (Lessona)." It is not said whether the peculiarity has been observed in more than one individual, and the description is the more puzzling, as the words "projiciente uti in L. furina" seem to contradict what is said in the account given of that species, "par ultimum pedum caudalium extremitatem præcedentium non superans." The account given of "*Seba* A. Costa" and of its species, "*S. innominata* A. Costa," agrees exactly with that given in the Brit. Mus.

Catal. by Spence Bate, except that to the generic account is added the fact that the upper antennæ are without accessory flagellum, and from the specific account is omitted the statement that the peræopods are subequal.

In the fourth subfam. Phoxinæ, Sp. B., is given "*Phoxus erythrophthalmus* Catta. A. Ph. Holböllii differt oculo perfecto in utroque latere. (Descriptio plenior nondum exstat.) Habit.: Marseille, Montredon (Catta)"; to *Pontocrates*, Boeck, is attached the synonym "*Krogeria* Sp. B.," which should be *Krogera*. *Acanthonotus*, Owen, is retained in preference to *Epimeria*, Costa, which, however, rightly supersedes *Acanthonotus*, preoccupied long before Owen used it. Here also Carus places "*Lilljeborgia* Sp. B." and *Guerinia*, Hope.

In the fifth subfam. Gammarinæ (Dana), Cls., the habitat of "*Mæra Blanchardi* Sp. B.," is given as "Capo S. Viti, Sicilia (Milne-Edwards)," but the Brit. Mus. Catal., p. 190, gives for this species "*Hab.* Cape of Santo Viti, Sicily (*M. Emile Blanchard*)," and ascribes to M. Blanchard "the description as well as the figure." To *Mæra erythrophthalma*, Heller, "*Eurystheus erythrophthalmus* Sp. B." is assigned as a synonym, although the latter species has the telson tubular, while Heller's species has "telson in partes duas triangulares, invicem imbricatas divisum." *Ceradocus*, A. Costa, is given as a synonym for *Melita*, Leach, as well as for *Mæra*, Leach, *Ceradocus orchestiipes*, A. Costa, being assigned under the latter as a synonym to *Mæra orchestiipes*, Heller. *Melita oxyura*, Catta, is thus described:—"Stipitis antennarum I. articulus 1. in extremitate spina forti armatus; segmenta caudalia margine postero-inferiore fortiter denticulato; stili caudales posteriores graciles breves. Habit.: Marseille, Ratonneau, 10–13 org. prof. (Catta)." To *Protomedeia*, Kr., the synonyms "*Leptocheirus* Zadd., *Ptilocheirus* Stimps.," are assigned. Zaddach's genus *Leptocheirus* has, however, been shown by Boeck to be distinct from *Protomedeia*. Some rearrangement therefore is necessary of the species assigned to this genus, viz. 1. *Protomedeia hirsutimana*, Sp. B. ♀. "Habit.: Marseille (var. *massiliensis*) Catta," which should be *Leptocheirus hirsutimanus*; "2. *Pr. pilosa* Sp. B. (*Leptocheirus pilosus* Zadd.)," which should be *Leptocheirus pilosus*, Zaddach; "3. *Pr. guttata* Gr. ♀," "4. *Pr. fasciata* A. Costa." The name *Protomedeia fasciata*, was used by Kröyer for the briefly described type species of his genus. Stimpson's genus is not *Ptilocheirus*, but *Ptilocheirus*.

In the sixth subfam. Lysianassinæ, Dana, for the eighth species, *Lysianassa ciliata*, Grube, the synonym "*? L. Audouiniana* Sp. B." is suggested, but whereas in *Lysianassa audouiniana*, "the central tail-piece is simple, squamiform, concave above, and rounded at the apex," which agrees with the definition of *Lysianassa* here given (*telson simplex squamiforme*), *Lysianassa ciliata*, Grube, on the contrary, has the telson "usque ultra medium fissum." *Egidia*, A. Costa, has been identified by Boeck with *Urothoë*, Dana, 1852. *Ichnopus calceolatus*, Heller, 1867, is identified by Boeck with his own *Ichnopus spinicornis*, 1860. "*Callisoma Barthelemyi* Hope," entered as "non descripta," has been both described and figured. See Note on Costa, 1853.

In the third tribe Hyperina, M.-Edw., in the first fam. Vibiliidæ (Dana) Cls., to "*Vibilia Jeangerardi* Lue., are suggested as synonyms, "*? V. speciosa* A. Costa, *? V. mediterranea* Cls." In the second fam. Hyperidæ (M.-Edw.), Sp. B., for *Lestrigonus mediterraneus*, A. Costa, is substituted *Hyperia mediterranea*, V. Crs. In the fourth fam. Platyscelidæ, Cls., and its first subfam. Typhidæ, Cls., the name *Eutyphis*, Cls., is adopted with the synonymy "*Typhis* Risso, *Thyropus* Dana ♂, *Dithyrus* Dana et *Platyscelus* Sp. B. ♀," of which, however, *Dithyrus*, Dana, has the claim of priority over *Eutyphis*. In the third subfam. Lycæidæ, Cls., to *Lycæa robusta*, Cls., a synonym is suggested in "*? L. pulex*, Marion. In the fourth subfam. Oxycephalidæ, Cls., *Oxycephalus*, M.-Edw., has the synonymy "*Natalius* A. Costa, *? Ornithorhamphus* De Nat.," and the species *Oxycephalus similis*, Claus, is accompanied by the synonym, "*? Natalius candidissimus* A. Costa." In

this subfamily are also placed, with notes of interrogation, the genera *Carcinornis*, A. Costa; *Orio*, Cocco; *Chiropristis*, Cocco; "*Ornithorhamphus*," de Natale.

It would have added to the usefulness of this exceedingly useful work, had there been an Index to this Part, in which the Latin descriptions of so large a number of genera and species are brought together. In regard to the arrangement of the group here adopted, it is not easy to see why some authors should place the Læmodipoda at the head or in the fore-front of the Amphipoda, since their structure, however well adapted to their modes of life, points very obviously to degradation, and seems as little as possible typical or representative.

1885. Chilton, Charles.

On an Example of Polymorphism in the Amphipoda. The Annals and Magazine of Natural History. November 1885. Ser. 5. Vol. XVI. London, 1885. pp. 368–376. Pl. X.

Mr. Chilton gives as the synonymy of *Aora typica*, Kröyer, the following names, *Lalaria longitarsis*, Nicolet, *Microdeuteropus mortoni*, Haswell, *Microdeuteropus tenuipes*, Haswell, *Microdeuteropus maculatus*, G. M. Thomson. He supports his view by minute details and figures of various specimens, and while giving one description for the female, he describes the other sex thus:—"*Male*. Three forms, all differing from the female in the character of the first gnathopod, which in each has the meros produced into a long spine reaching about to the end of the carpus.

"The forms may be distinguished as follows:—

"1. (*Aora typica*, Kröyer.)—Basos with a tooth projecting forwards on the anterior margin; carpus longer than the propodos, but of about the same breadth.

"2. (*Microdeuteropus maculatus* ♂, Chilton.)—Carpus longer and broader than propodos; meros with small tuft of setæ on posterior margin.

"3. (*Microdeuteropus Mortoni*, Haswell.)—Carpus longer and broader than the propodos; meros hollowed anteriorly and with each lateral margin densely fringed with setæ; dactylos as long as propodos and with two or three tufts of setæ on concave border."

He repeats an opinion previously expressed that the name *Microdeuteropus* will have to become a synonym of *Aora*.

1885. Filhol, H.

Observations relatives aux espèces du genre *Paramithrax*, vivant en Nouvelle Zélande. Bull. Soc. Philom. IX. p. 26.

Contains notes on *Allorchestes stewarti*, n. s., and *Allorchestes campbellica*, n. s., p. 51. (G. H. Fowler, Zool. Record for 1885.)

1885. Frenzel, Joh.

Über den Darmcanal der Crustaceen nebst Bemerkungen zur Epithelregeneration. Arch. Mikr. Anat. 25. Bd. p. 137–190. T. 8–9.

According to the Zool. Jahresbericht für 1885, *Phronima* is one of the animals investigated in regard to the subject of this paper.

1885. GIESBRECHT, W.

Zoologischer Jahresbericht für 1884. II. Abtheilung. Berlin, 1885. Crustacea. pp. 7–65.

1885. GILES, G. M.

Natural History Notes from H.M.'s Indian Marine Survey Steamer "Investigator," Commander A. Carpenter, R.N. No. 1. On the structure and habits of *Cyrtophium calamicola*, a new tubicolous Amphipod from the Bay of Bengal. [*Reprinted from the Journal of the Asiatic Society, Bengal, Vol. LIV. Part ii. No.* 1, 1885.] Calcutta, 1885.

The careful description and figures of this new species "found in the surface-net about the Palmyras shoal and the mouth of the Dhamra river on the Orissa Coast," show that it is not a *Cyrtophium*, but a *Cerapus*. Templeton's notes on *Cerapus abditus* will be recalled by the remark made upon this species, that "when alive and at ease, it would frequently turn itself inside its tube, and protrude its head from the opposite extremity." Observations made on the structure of the tube are here recorded. In this paper the appendages of the thorax are reckoned as eight pairs, the first gnathopods being called the "2nd pair of appendages" as an alternative title, and the fifth peræopods being spoken of only as the 8th pair of appendages.

1885. GILES, G. M.

Natural History Notes from H.M.'s Indian Marine Survey Steamer "Investigator," Commander A. Carpenter, R.N. No. 2. Description of a new species of the Amphipod genus *Melita* from the Bay of Bengal. [*Reprinted from the Journal of the Asiatic Society, Bengal, Vol. LIV. Part ii. No.* 2, 1885.] Calcutta, 1885.

Two specimens, a male and female, were available for the description of the new species, named *Melita megacheles*. They were "brought up by the hempen tangles from 12½ fathoms near the Mutla Light Ship." The species is figured on pl. iii.

1885. GILSON, G.

La Cellule: Recueil de Cytologie et d'Histologie générale. Lierre, 1885.

"Spermatogénèse chez les Arthropodes (188 pp., 8 pls.) by G. Gilson; *Oniscus*, *Asellus*, *Gammarus*, p. 140 *et seq.*" (G. H. Fowler, in Zool. Record for 1885.)

1885. GUERNE, JULES DE, born August 20, 1855 (J. de G.).

Zoologie. La rade de Dunkerque. Revue scientifique (revue rose). Numéro 11. 22ᵉ année).—14 Mars 1885.

M. de Guerne, in discussing the fauna of the buoys, says (p. 327) that upon them "au milieu des hydraires grouille une innombrable quantité d'amphipodes (*Podocerus pulchellus*)."

"Ces petits crustacés construisent des cellules où la vase entre pour une grande part." He combats the view expressed in the British Sessile-eyed Crustacea, i. 438, that in rough weather they withdraw to the depths, by the following arguments; neither the *Podoceri* nor their nests are ever dredged in the neighbourhood of the buoys, although other Amphipods of similar size and agility are so procured; the whole *Podocerus* family is found on the buoy, showing that multiplication takes place there, and implying a permanent residence; other creatures less well endowed than the *Podoceri*, as to means of adhesion and locomotion, pass their lives on the buoys and lay their eggs there.

1885. Haswell, W. A.

Revision of the Australian Læmodipoda. Extracted from Vol. IX., Part 4, of the Proceedings of the Linnean Society of New South Wales. 8 pp. Pls. XLVIII. XLIX. 1885.

This paper is a commencement of the revision to which Mr. Haswell proposes to subject his earlier work, now that attention has been so much drawn to the Amphipod fauna of the south, as well by Mr. Haswell's own writings, as by those of the zealous naturalists of New Zealand, Mr. G. M. Thomson, Mr. Charles Chilton, and Mr. T. W. Kirk. The paper describes and figures parts of two new species, *Proto condylata* and *Proto spinosa*. It gives additional figures and particulars relating to *Protella australis*, Haswell, and states that "it is a very well-marked species and quite distinct from *Protella gracilis* of Dana, to which Mayer is inclined to unite it, both in the form of the head and of the gnathopoda." The description is quoted which Mayer gives of "*Protella Haswelliana*," a species which has the two last segments of the peræon coalesced. *Caprella cornigera*, Haswell, = ? *Proto cornigera*, Mayer, is transferred to a new genus, *Hircella*, somewhat prematurely, on the supposition that the three anterior pairs of peræopods are rudimentary. Mayer proposed the new genus if it should prove that the appendages mentioned are in the supposed condition, but Mr. Haswell does not say whether he has or has not had an opportunity of determining this point.

1885. Haswell, W. A.

Notes on the Australian Amphipoda. Proceedings of the Linnean Society of New South Wales. Vol. X. Part. 1. 1885. 20 pp. Pl. 10–18.

To *Talitrus sylvaticus*, Haswell, pl. x. fig. 1., *Talitrus affinis*, Haswell, is assigned as a synonym, *affinis* being evidently a mistake for *assimilis*.

Remarks are made on some of the Australian species of *Allorchestes* instituted by Dana and by Mr. Haswell respectively. Under *Neobule algicola*, pl. xi., figs. 4–6, it is suggested that the genus *Neobule*, Haswell, may be the same as *Hyale*, Rathke. Of *Aspidophoreia*, Haswell, it is said:—"This genus stands between *Allorchestes* and *Nicea*, differing from both in the large size of the anterior coxæ, from *Allorchestes* also in the character of the telson, and from *Nicea* in the large size of both upper and lower antennæ, and in having the lower pair much larger than the upper.

Additional details are given as to *Stegocephalus latus*, Haswell, pl. xi., figs. 7–12, and *Ampelisca australis*, Haswell, pl. xii., figs. 7–16, and pl. xiii., figs. 1–4.

Mr. Haswell here refers *Lysianassa nitens*, pl. xii., figs. 1, 2, to the genus *Anonyx*. He would keep *Lysianassa australiensis* and *Lysianassa affinis* as distinct species, but I still think that the distinctions he mentions are insufficient to keep them separate from *Anonyx nitens*. He mentions that the telson is deeply cleft in all, a character inconsistent with the received

definition of *Lysianassa*. To *Eusirus dubius*, Haswell, he adds the account of a variety, pl. xiv., fig. 1, and a new species, *Eusirus affinis*, pl. xiv., figs. 2–4. From the information given I am inclined to group all three forms with one described in this Report under the name *Liljeborgia haswelli*. It would not, I think, be reasonable to transfer the specific title *dubius*, which was applicable enough in connection with the generic name *Eusirus*, to the undoubted position of the new species in the genus *Liljeborgia*. In the British Museum Catalogue by some accident the telson in this genus is said to be entire, a mistake corrected in Bate and Westwood's subsequent work. Probably Mr. Haswell's attention was diverted from the genus *Liljeborgia*, when he found the telson in his own species cleft almost to the root. He accepts the view of Miers that *Leucothoë commensalis* is a variety of *Leucothoë spinicarpa*, and states that *Leucothoe gracilis* and *Leucothoe diemenensis* are to be regarded as marked varieties of the same. He describes a new species under the name *Atylus hamochir*, pl. xiii., figs. 5–7, which will also be found described and figured among those brought home by the Challenger. "*Dexamine Miersii*," n. s., pl. xiii., figs. 8–12, is described. Figures, pl. xv., figs. 1–4, and description are given of "a species from Port Stephens which is very nearly related to *Megamœra suensis*, and yet differs from it in several particulars." "This species bears a considerable general resemblance also to *Mœra hamigera*, but the modification of the left posterior gnathopods in this latter species is so special as to distinguish it very clearly." *Megamœra thomsoni*, Miers, is identified with *Megamœra mastersii*, Haswell. *Mœra spinosa*, Haswell, *Mœra ramsayi*, Haswell, and *Mœra festiva*, Chilton, are identified with *Mœra rubro-maculata*, Stimpson. To this list of synonyms must no doubt be added *Megamœra serrata*, Spence Bate. Mr. Haswell speaks of "the form figured by Stimpson," but without saying where the figure is to be found. Fresh figures are given of *Xenocheira fasciata*, Haswell, pl. xvi., figs. 1–3, with the remark that "in most of its characteristics this species shows evident relationships with *Microdeuteropus*. In fact it is only the form and proportions of the gnathopoda (figs. 1 and 2) that separate it from the normal members of that genus, with which it is connected through the European *M. versiculatus*, Spence Bate." Of *Haplocheira typica*, pl. xvi., figs. 4–8, Mr. Haswell writes that its relations are rather with the Podocerides than with the Gammaridæ, "the last pair of pleopods being short, with slightly hooked spines on the outer ramus, and a very short inner ramus with a simple pointed spine, and the telson (fig. 8), being a small undivided plate with a strong hook at each of its postero-lateral angles." He says further, "the superior antennæ have small two-jointed appendages—a feature which I overlooked in my first examination. The flagellum of the inferior antennæ has three distinct joints. The anterior gnathopods (fig. 4) might be described as very imperfectly subcheliform—the propus having a small lobe at the base of the dactylus. The nearest ally of the genus seems to be *Corophium*, and *C. Lendenfeldi* of Chilton (Trans. N. Z. Inst. etc.) is probably this species." *Gammarus barbimanus*, Thomson, 1879, takes precedence as *Haplocheira barbimanus*. Of *Harmonia crassipes*, Haswell, pl. xvi., fig. 9, he writes, "The relations of this species were not correctly expressed by the position in which it was placed in the 'Catalogue of Australian Crustacea.' It is a member of the family *Corophiidæ*, distinguished from *Amphithoë*, *Sunamphithoë* and *Nænia*, among other points, by the presence of an appendage on the superior antennæ, from *Cerapus* by the biramous character of the posterior pleopoda, and from *Podocerus* by the multi-articulate flagella of both pairs of antennæ. The genus may be defined as follows:—Coxæ not so deep as the corresponding segments; antennæ both with multi-articulate flagella, the superior pair with an appendage. Mandibles palpigerous. Maxillipedes unguiculate, sub-pediform, with a squamiform process on the basos only. Gnathopods sub-chelate, unequal, posterior pair very large. Posterior pleopods biramous, the outer ramus with slightly hooked spines and straight hairs, the inner with straight hairs only. Telson single, long, pointed." From

this description it seems possible that *Harmonia* may be a synonym of *Grubia*, Czerniavski, 1868, but for that genus the mouth-organs have not been described.

Cyrtophium dentatum, Haswell, pl. xvii., figs. 8–12, is transferred to a new genus, *Dexiocerella*, described as differing from Dana's genus *Cyrtophium* as defined by Spence Bate, by "the superior antennæ having a short, multi-articulate flagellum and a well-developed secondary appendage." This is obviously the same as Dana's *Platophium*. See Note on Dana, 1852. *Dexiocerella lobata*, pl. xviii., figs. 6–8, and *Dexiocerella lævis*, pl. xviii., figs. 10–12, are described and in part figured, as new species belonging to this genus. *Cyrtophium hystrix*, Haswell, is transferred to *Latmatophilus*, Bruzelius, since the superior antennæ have no secondary appendage, and the second uropods are wanting. *Cyrtophium minutum*, pl. xviii., figs. 1–5 and fig. 9, remains as satisfying the requirements of Spence Bate's definition of *Cyrtophium*, while *Cyrtophium parasiticum*, pl. xvii., figs. 1–7, is stated to be a connecting link between the new genus *Dexiocerella* and the old *Cyrtophium*, since it "has the flagellum of the lower antennæ well-developed and indistinctly multi-articulate, but has no appendage to the superior antennæ." The genus of Bruzelius is given as *Læmatophilus*, but there cannot be any doubt about the true spelling, as Bruzelius derives it from λαῖτμα and φίλος. Some additional figures and particulars are given for *Proto novæ-hollandiæ*, pl. xviii., figs. 13–16.

1885. KOEHLER, RENÉ.

Recherches sur la Faune Marine des Iles Anglo-normandes. 70 pages. Nancy. Extract from the Bulletin de la Société des Sciences de Nancy.

Among the 126 species of Crustacea which Dr. Koehler took in the Channel Islands, and principally in Jersey, were several Amphipods, which he enumerates. At Sark he took several specimens of *Aora gracilis*, which, however, is not, as he supposes it, rare.

A species of *Gammarella*, closely allied to *Gammarella brevicaudata*, he proposes to name *Gammarella longicornis*, from the length of the antennæ, but this is too variable a character to be any criterion of a distinct species, and the specimens, as Dr. Koehler informs me, had accidentally been dried up, before he could submit them to detailed examination. He mentions, among other common Amphipoda at Jersey, *Erysthrarus edriophtalmus*, Sp. B., which is in all probability a slip of the pen for *Eurystheus erythrophthalmus*. Thirty-two species of Amphipoda were observed. From Guernsey Dr. Koehler has since sent me a specimen of *Atylus vedlomensis*, Bate and Westwood.

1885. MARTENS, E. VON.

Crustacea. The Zoological Record for 1884; being Volume the twenty-first of the Record of Zoological Literature. London, M.DCCC.LXXXV.

In the "Biological Observations," the recorder mentions "Several new *Gregarinidæ* found in *Portunus*, *Carcinus*, *Pachygrapsus*, *Dromia*, *Nicoea* [? Nicea], *Phronima*, and *Caprella*; J. FRENZEL, Arch. mikr. Anat. xxiv. pp. 545–579, pl. i. figs. 1–69."

Under "Geographical Distribution," he mentions, from papers which I have not seen, the occurrence in Limfjord, Jutland, of two Caprellidæ, on the authority of "J. COLLIN, Limfjordens marine Fauna, pp. 21 & 22," and in the Baltic of eleven Amphipods, including the fresh-water *Gammarus pulex*, on the authority of "M. BRAUN, Arch. Nat. Liv. (2) x. pp. 98–102, 114, & 112."

1885. Murdoch, J.

Seven new species of *Crustacea* and one Worm from Arctic Alaska. Proceedings of the United States National Museum. VII. Washington. pp. 518–522.

Acanthozone polyacantha, n. s., *Melita formosa*, n. s., *Melita leonis*, n. s. (G. H. Fowler, in Zool. Record for 1885.)

1885. Packard, A. S.

On the structure of the brain of the Sessile-eyed Crustacea. Read at Washington, April 14, 1884. Memoirs of the National Academy of Sciences. Vol. III. Part 1. 1884. Washington, 1885. pp. 97–110. 5 Plates.

The investigation appears to refer almost exclusively to Isopods, but in the section headed "Morphology of the Brain," Packard says, "the brain of the Isopods and Amphipods is a *syncerebrum*, though far less complicated than in the Decapoda. It will be remembered that Professor Lankester, in his memoir on Apus, designates the simple brain of that crustacean as an *archicerebrum*, while the composite brain of 'all crustacea, excepting Apus, and possibly some other Phyllopods,' he denominates a *syncerebrum*." "As seen in Fig. 1, the brain or supraesophageal ganglion is a composite mass or group of four pairs of ganglia, *i.e.* (1) the brain proper or procerebral lobes, (2) the optic ganglia, (3) the first antennal, and (4) the second antennal lobes. These lobes are quite separate from each other in the Isopoda and Amphipoda as compared with the Decapoda."

On "the histological elements of the ganglia," he remarks that "there are in the Asellidae, as in insects and Decapods, three kinds of elements in the brain and other ganglia, viz.: (1) ganglion cells; (2) nerve fibers; and (3) Leydig's *punktsubstanz* (mark-*substanz* of Leydig and Rabl-Rückhard, and especially Dietl), which might be called the *myeloid* tissue or substance." "This is the central finely granular part of the brain, in which granules have short irregular fibers passing through them."

Pages 10 to 13 contain a "Bibliography of works on the nervous system of Crustacea."

1885. Sars, G. O.

Den norske Nordhavs-Expedition 1876–1878. The Norwegian North-Atlantic Expedition 1876–1878. Zoology. Crustacea. I. By G. O. Sars. With 21 Plates and 1 Map. Christiania, 1805.

Not only is the title-page of this fine work given in English as well as in Norwegian, but the two languages are employed throughout in parallel columns. The description of the Amphipoda extends from page 139 to page 233, with supplementary notes on page 270. They are figured on Plates 12 to 18, and Plate 20, Fig. 21, in this author's usual masterly manner. He reminds his readers on page 1 that the new forms to be discussed in the present work have already been briefly characterised in earlier papers, the Prodromus descriptionis of 1876, and the Crustacea et Pycnogonida of 1879. Hence, of the species here called new all belong in fact to one or other of those dates, with the exception of the very remarkable "*Hyperiopsis Vøringii*."

In Tribus I. Gammarina, the genera and species are distributed and numbered as follows:— Fam. I. Lysianassidae. Gen. I. *Socarnes*, Boeck, 1870, with the note, "I retain for the

present the generic subdivision proposed by Boeck, though, in my judgment, a closer revision of the family will show the need of slightly reducing the number of genera." 31. *Socarnes bidenticulatus*, Sp. Bate, with the synonymy, "*Lysianassa bidenticulata*, Sp. Bate, Ann. & Mag. Nat. Hist., Ser. 3, Vol. 1, p. 362. *Lysianassa nugax*, Sp. Bate, Cat. Amphip. Brit. Mus. p. 65. Pl. x. fig. 3 (non Phipps). *Lysianassa Vahlii*, Goës, Crust. Amphip. Spitsb. No. 2 (ex parte). *Anonyx bidenticulatus*, Miers, Spitsb. Crust. Ann. & Mag. Nat. Hist., 1877. p. 136," distinguished from the closely allied *Anonyx vahlii*, to which Goës has referred it, by the bidenticulate lateral plates of the third abdominal segment; Gen. 2. *Hippomedon*, Boeck, 1870. 32. *Hippomedon holbolli* (Krøyer), var., with the synonym, "*Hippomedon abyssi*, G. O. Sars, Prodromus descriptionis Crust., etc., No. 94 (non Goës)," a variety without eyes. Gen. 3. *Anonyx*, Kroyer, 1883 [1838]. 33. *Anonyx calcaratus*, "*Anonyx* (*Hippomedon*) *calcaratus*, G. O. Sars, Crust. & Pycnogonida nova etc., No 16." "Of the previously known *Anonyx* species, it unquestionably approximates closest *A. pumilus* Lilljeborg, but is easily recognized by the much more produced posterior lateral corners on the 3rd abdominal segment, as also the peculiar spur like projection on the basal joint of the last pair of legs, a character that suggested the specific designation. In the imperfect subcheliform structure of the 1st pair of legs, it differs from all other known species of the genus, agreeing in this respect rather with the genera *Lysianassa* and *Socarnes*." 34. *Anonyx typhlops*, carinate on the fourth abdominal segment, totally devoid of eyes. Gen. 4. *Onisimus*, Boeck, 1870, in the table of contents and index spelt *Onesimus*. 35. *Onisimus turgidus*, "*Anonyx* (*Onisimus*) *turgidus*, G. O. Sars, Crust. et Pycnogonida nova etc., No 13," "approximates closest *O. Edwardsii* Kröyer, from which however it may at once be distinguished by the remarkably clumsy and inflated form of body, a character that gives the animal greater resemblance to *O. plautus* Kröyer, which, in other respects, however, differs very decidedly." 35. *Onisimus leucopis*, "*Anonyx* (*Onisimus*) *leucopis*, G. O. Sars, Crust. & Pycnogonida nova etc., No. 14," distinguished by "the imperfect development of the eyes and the shape of the telson," which is "very faintly emarginate at extremity." Gen. 5. *Tryphosa*, Boeck, 1870. 37. *Tryphosa pusilla*, "*Anonyx* (*Tryphosa*) *pusilla*. G. O. Sars, Crust. & Pycnog. nova etc., No. 15." "The present species I refer here to Boeck's genus *Tryphosa*. In my judgment, however, both this genus and the genera *Onisimus* and *Orchomene* should, perhaps, more properly be eliminated and their species ranged under the genus *Anonyx*. From the other forms referred by Boeck to the genus *Tryphosa*, the present species may be recognised by the total absence of eyes, the remarkably slender secondary flagellum on the 1st pair of antennæ, and the form of the head." Gen. 6. *Acidostoma*, Lilljeborg, 1865. 38. *Acidostoma laticorne*, "from the only hitherto known species of this genus, viz. *A. obesum* Sp. Bate, the present is easily distinguished by the total absence of eyes, the prodigiously developed 1st pair of antennæ, and the remarkably robust 3 posterior pairs of legs. Moreover, in the rudimentary character of the last pair of caudal stylets, as also the posteriorly non-incised telson, this species differs essentially from the typical form."

Fam. 2. Phoxidæ. Gen. 1. *Phoxus*, Kröyer, 1842. 39. *Phoxus oculatus*, distinguished by the well-developed, darkly pigmented eyes, and from *Phoxus holbölli*, Kröyer, "by the more thickset form of body, the shorter and more obtuse frontal plate, as also by a somewhat different shape characterizing the basal joint of the last pair of legs." Gen. 2. *Harpinia*, Boeck, 1870. 40. *Harpinia abyssi*, distinguished by its size, reaching 13 mm., peculiar form of basal joint of last pair of legs, "by the obtusely rounded lateral plates on the 3rd abdominal segment, and finally by the hunched projection formed above by the succeeding segment." 41. *Harpinia carinata*, possibly males of preceding species, but differing in structure of antennæ, and also in "the distinctly keeled posterior division of

the body, the form of the 2 posterior pairs of legs and of the telson." 42. *Harpinia mucronata*, "distinguished by the strong, hook-shaped point formed posteriorly by the lateral plates of the 3rd abdominal segment, as also by the very peculiar form characterizing the basal joint of the last pair of legs." 43. *Harpinia serrata*, very near to *Harpinia plumosa*, Kröyer, but distinguished by "the anterior abdominal segments being densely pubescent above," and by the serrate basal joint of the last pair of legs. Gen. 3. *Urothoë*, Dana, 1852. 44. *Urothoë abbreviata*, length, 3 mm., "easily recognizable by its remarkably short and thickset body, the peculiar form distinguishing the first pair of antennæ, the absence of eyes, and by the short last pair of caudal stylets."

Fam. 3. Epimeridæ. Gen. 1. *Epimeria*, Costa, 1851. 45. *Epimeria loricata*, "Colour a gorgeous red. Length reaching 40 mm., distinguished from *Epimeria cornigera*, Fabr., by "size, remarkably firm integuments, and the deviating armature of the body. Gen. 2. *Paramphithoë*, Bruzelius, 1859. 46. *Paramphithoë euacantha*, "*Pleustes euacantus* [*euacanthus*], G. O. Sars, Prodromus Crust. et Pycnog. etc., No. 110.," "approximates very closely *P. pulchella* Kröyer, but is easily recognized by the thoracic segments, including the 3 anterior ones, being all of them keeled and running out as dorsal projections, whereas in the former species this is the case with the posterior ones only. Moreover, the form of the 2 anterior pairs of legs differs somewhat. The genus *Paramphithoë* is referred by Boeck to the family *Oedicerinæ*. In my judgment it should rather be classed among the Epimeridæ. Furthermore, I have seen fit to retain Sp. Bate's genus *Pleustes* for *P. panopla*, Kröyer, and the species nearest related to that form." Sars is here referring to Boeck's work of 1870, for in his posthumous volume, 1876, *Paramphithoë*, as limited by Boeck, is made a synonym of *Pleustes*, Sp. Bate, included indeed among the Oedicerinæ, but with the remark, "Genus Pleustes ad subfamiliam Oedicerinæ vix referendum est."

Fam. 4. Oediceridæ. Gen. *Oediceros*, Kröyer, 1842. 47. *Oediceros macrocheir*, to be "recognized by the remarkably small and non-inspissated frontal projection, the absence of eyes, and the prodigious development characterizing the 2 anterior pairs of legs."

Fam. 5. Atylidæ. Gen. *Halirages*, Boeck, 1870. 48. *Halirages quadridentatus*, very near *Halirages fulvocinctus*, M. Sars, but distinguished by size, length 24 mm., "greater number of dorsal spines, and the deviating form and armature of the lateral plates of the 3rd abdominal segment." Gen. 2. *Cleippides*, Boeck, 1870. 49. *Cleippides quadricuspis*, Heller, total length of specimens reaching 52 mm., the antennæ not included. Gen. 3. *Amphithopsis*, Boeck, 1860. 50. *Amphithopsis pulchella*, nearest *Amphithopsis latipes*, M. Sars, but "distinguished by a less thickset body, the absence of a dorsal keel, less robust ambulatory legs, as also by its colour. Moreover, the form of the 2 anterior pairs of legs is rather different."

Fam. Gammaridæ. Gen. 1. *Maera*, Leach, 1813. 51. *Maera tenera*, "*Maera tenella*, G. O. Sars, Prodromus descriptionis Crust. etc., No. 119 (non Stimpson)," "distinguished by its remarkably slender body, the evenly rounded 1st pair of epimera, the total absence of eyes, and the linear form of the basal joint of the 3 posterior pairs of legs." Gen. 2. *Melita*, Leach, 1813. 52. *Melita pallida*, "posterior margin of all abdominal segments, with exception of last, jutting out above as 2 flat, appressed spines, from between which rise two or three considerably smaller one. Lateral plates of 3rd segment produced posteriorly to a sharp point. No eyes." Gen. 3. *Amathillopsis*, Heller, 1875. 53. *Amathillopsis spinigera*, Heller, "length of largest specimens reaching 50 mm."

Fam. Syrrhoidæ. Gen. *Bruzelia*, Boeck, 1870. 54. *Bruzelia serrata*, distinguished from *Bruzelia typica*, Boeck, "by the sharply-marked dorsal keel, with its high, compressed projections, as also by the posteriorly serrate lateral plates on the 3rd abdominal segment."

Fam. Stenothoidæ. Gen. 1. *Metopa*, Boeck, 1870. 55. *Metopa spectabilis*, "length reaching

14 mm.," very near to *Metopa alderi*, Sp. Bate, but "let alone the far greater size, it can immediately be recognized by the very unequal development of the 2 pairs of antennæ—perfectly uniform in both sexes; whereas the antennæ (in the female of *M. Alderi* at least) are about equal in length; moreover, by the armature characterizing the hand of the 2nd pair of legs; and finally, by the 3rd joint of the hindmost pair of legs being less dilated posteriorly." Sars notes that he has well-marked specimens from Hammerfest, "which are indeed a good deal smaller." 56. *Metopa æqvicornis*, "length 7½ mm.," distinguished from *Metopa spectabilis* "by its inferior size, as also by the greatly elongated and equally developed antennæ. From *M. longicornis*, Boeck, which, in the appearance of the antennæ, approximates closest the present species, it differs by the greater elongation of the 2nd joint of the 1st pair of antennæ, as also by the different form and armature of the hand of the 2nd pair of legs." Gen. 2. *Danaia*, Sp. Bate, 1862, with *Cressa*, Boeck, for a synonym. 57. *Danaia abyssicola*, differs from *Danaia dubia*, Sp. Bate, and *Danaia minuta*, Boeck, "by the total want of eyes, the remarkably elongated first pair of antennæ, and by the form of the first pair of legs." As the oral appendages could not be examined, it remains uncertain whether this species agrees with Bate's account of *Danaia* or Boeck's of *Cressa*.

Fam. Leucothoidæ. Gen. 1. *Lilljeborgia*, Sp. Bate, 1862. 58. *Lilljeborgia æqvicornis*, marked "by its want of distinctly developed eyes, by the presence of only one dorsal spine, by the uniform development of the antennæ, and finally by the peculiar structure of the first pair of legs in the male." The generic name is properly *Liljeborgia*. Gen. 2. *Tritropis*, Boeck, 1870. 59. *Tritropis appendiculata*, "the form treated of here exhibits in some respects a rather striking deviation from the other species referred to the genus *Tritropis*, and may possibly be found to constitute a separate genus." See Note on G. O. Sars, 1880. No. 27.

Fam. Ampeliscidæ. Gen. *Ampelisca*, Kroyer, 1842. 60. *Ampelisca odontoplax*, "length 24 mm.," distinguished "by its total want of eyes and the peculiar dentiform projection on each of the three anterior pairs of epimera, a character that suggested the specific designation," "presenting in its outer habitus closest resemblance to *A. spinipes*, Boeck." 61. *Ampelisca minuticornis*, "length 8 mm.," to be recognised "by the unusually small antennæ, its want of eyes, as also the considerable size of the expansion distinguishing the basal joint of the last pair of legs posteriorly." Gen. 2. *Byblis*, Boeck, 1870. 62. *Byblis abyssi*, "differs from the typical species, *B. Gaimardii* Kröyer, by the total want of eyes and the much less elongate head," and is distinguished from *Byblis crassicornis*, Metzger, "by the somewhat different structure of the antennæ and the caudal stylets," which "are all uniform in structure, with simple lanceolate and naked branches. They diminish successively in length backwards, and reach therefore, when stretched back, to about the same transverse line."

Fam. Mierodeutopidæ. Gen. *Automoë*, Bruzel, 1859. 63. *Automoë megacheir*, "distinguished from the other two Norwegian species by its total want of eyes, the greatly elongated basal joint of the 1st pair of antennæ, and the structure characterizing the 1st, and in part too, the 3rd and 4th pairs of legs, as also by their far less dense armature of bristles."

Fam. Podoceridæ. Gen. 1. *Podocerus*, Leach, 1815. 64. *Podocerus assimilis*, nearest *Podocerus megacheir*, Boeck, "but differs from that animal in having a somewhat robuster form of body, larger epimera, the rudimentary character distinguishing the secondary flagellum of its 1st pair of antennæ, as also in the lateral plates of the 3rd abdominal segment not being angular, but obtusely rounded posteriorly." 65. *Podocerus brevicornis*, somewhat resembles *Podocerus latipes*, Kröyer, but differs "in its want of eyes, the pointed lateral corners of the head, the shorter and less abundantly bristle-beset antennæ, as also in a somewhat deviating form distinguishing the 2 foremost pairs of legs." 66. *Podocerus tenuicornis*, "*Podocerus longicornis*, G. O. Sars. Crust. & Pycnog. nova etc., No. 38 (non Heller)," "length 3 mm.," a species "distinguished from the 2 preceding ones by its remarkably elongate and slender

antennæ, furnished posteriorly with long fascicles of bristles,—by the greatly produced lateral corners of the head, and also by the comparatively feeble structure characterizing the foremost pair of legs." Gen. 2. *Erichthonius*, Edw., 1850. 67. *Erichthonius megalops*, "*Cerapus megalops*, G. O Sars, Crust. & Pycnog. nova etc., No. 39," distinguished "by its unusually large and dark-coloured eyes, greatly elongated antennæ, and the form of the 2nd pair of legs in the male. The genus *Cerapus*, Say, of which *C. tubularis* is the type, differs essentially, as shown by Sidney Smith, from the genus *Erichthonius* Edw., belonging, as it does, to the family *Corophiidæ*. The only Northern species of this genus is *C. crassicornis* (Siphonœcetes) Sp. Bate, also met with on the coasts of Norway."

Fam. Corophiidæ. Gen. *Unciola*, Say, 1818. "Syn: Glauconome, Kröyer, 1845." 68. *Unciola petalocera*, "*Glauconome petalocera*, G. O. Sars. Crust. & Pycnog. nova etc., No. 40," "length 10 mm." "The present species bears closest resemblance to *U. planipes* Norman, but it is easily recognized by its greater size and the peculiar lamellar form of the 3rd and 4th joints of the 2nd pair of antennæ in the male, as also by the structure of the 1st pair of legs. The 2nd pair of legs differs in the two sexes from those of *U. planipes*, the hand occurring vertically truncate at the extremity and with a well-defined palmar margin."

Fam. Dulichiidæ. Gen. *Dulichia*, Kroyer, 1845. 69. *Dulichia tuberculata*, Boeck, "*Dulichia septentrionalis*, G. O. Sars. Crust. et Pycnog. nova etc., No. 41." 70. *Dulichia hirticornis*, distinguished from earlier species "by its remarkably clumsy form of body, comparatively robust and densely hirsute antennæ, and small whitish-yellow eyes." 71. *Dulichia macera*, "distinguished by its slim form of body and greatly produced limbs, rudimentary eyes, as also the peculiar form characterizing the 2nd pair of legs in the male."

Tribe 3. Caprellina. Fam. Caprellidæ. Gen. *Caprella*, Lamk. 1818 [1801]. 72. *Caprella microtuberculata*, "of the previously known species, this approximates closest *C. linearis* Lin., but admits at once of being distinguished by the much more produced 1st pair of antennæ, the form of the 2nd pair of legs, and the different colouring." The last of these distinctions must be noted as of very doubtful specific value. 73. *Caprella spinosissima*, Norman, "*Caprella spinosissima*, Wyville Thomson, The Depths of the Sea, p. 126. *Caprella horrida*, G. O. Sars, Prodromus descript. Crust. & Pycnog. etc., No. 137." "On a former occasion," Sars observes, "I recorded this characteristic species under a new name, viz., *horrida*, to prevent its being confounded with Stimpson's *Æginа spinosissima*. Meanwhile, as the latter is identical with the form *Caprella spinifera*, described somewhat earlier by Bell, and must, therefore, bear the last-mentioned specific designation, I see no reason for suggesting any change in the name proposed by Norman for the species treated of here; wherefore it is now retained." As, however, the name *Caprella spinosissima* has been used by Spence Bate for the species named *Æginа spinosissima* by Stimpson in 1854 and *Caprella spinifera* by Bell in 1855, it becomes a synonym of the former, and cannot be used again for Norman's species, which will therefore revert to the name *Caprella horrida*. G. O. Sars. See also Note on C. Wyville Thomson, 1873. Gen. 2. *Æginа*, Kröyer, 1843. 74. *Æginа spinifera*, Bell, the synonymy given being *Caprella spinifera*, Bell, 1855, *Æginа spinosissima*, Stimpson, 1857. *Æginа spinosissima*, G. O. Sars, Prodromus descript. Crust. & Pycnog. No. 135. "Boeck's *Æginа echinata* differs obviously alike in the armature of the body and the structure of the 2nd pair of legs." The species is therefore, as just observed, *Æginа spinosissima*, Stimpson, 1854. Indeed, as to Stimpson's priority, I may here mention that a separate copy of Stimpson's Synopsis, which I have recently obtained, shows the following dates; on the cover, "Washington City: published by the Smithsonian institution, January 1853."; on the title-page, "[accepted for publication January, 1853.]"; the introduction signed "William Stimpson. Smithsonian Institution, *February*, 1853."; on the page containing "references to the figures," "published by the Smithsonian Institution, Washington, D.C. March, 1853."

Tribe 4. Hyperiina. Fam. Hyperiidæ. Gen. *Hyperiopsis*, n. "Generic Character.—Body of the usual form in Hyperidians, tumid anteriorly, with back broad and small epimera. Head large, with upper part prominently arcuate. Eyes incompletely developed. First pair of antennæ larger than 2nd, with peduncle short and a well-developed accessory flagellum. Mandibles furnished with distinctly developed palps. The 2 foremost pairs of legs feeble in structure, simple, non-subcheliform; the 2 succeeding pairs with 3rd joint very large, compressed, lamelliform; the 3 posterior pairs slender, almost filiform, with basal joint but slightly expanded; last joint longest. Pleopods powerfully developed. The 2 foremost pairs of caudal stylets simple, two-jointed; last pair biramous. Telson rudimentary." "It is far from improbable that a closer examination will show the necessity of selecting it [Hyperiopsis Voringii] as the type of a distinct group within the tribe *Hyperiina*. The most striking peculiarity in the present form is the distinct and rather large secondary flagellum on the 1st pair of antennæ, a character quite alien to Hyperidians in general." 75. "*Hyperiopsis Voringii*," n. sp. "The specimen examined would appear, judging from the structure of the antennæ, to be a female," length 11 mm., taken off the Norwegian coast at a depth of 600 fathoms. [The fifth and sixth pleon-segments are not coalesced.]

In the Oversigt af Norges Crustaceer, 1882, Sars divides the Amphipoda into Tribe 1. Hyperina, Tribe 2. Gammarina, Tribe 3. Caprellina. In the the present work we find Tribe 3. Caprellina, but Tribe 1. Gammarina, and Tribe 4. Hyperiina, without any Tribe 2. It may be presumed that the change of order was intentional, and that the numbers would have been consecutive but for an oversight.

The appendix, p. 276, mentions that *Socarnes oralis*, Hoek, is a synonym of *Socarnes bidenticulatus* (Sp. Bate), and that in regard to the shallow-water specimen from north of Spitzbergen referred by Hoek to *Onesimus leucopis*, G. O. Sars, the correctness of the determination is very questionable.

1885. Schneider, J. Sparre.

Pontocrates norvegicus, Boeck, und Dexamine thea, Boeck, Ein Beitrag zur Kenntniss der Amphipoden des arktischen Norwegens. Tromsö. Mit 2 Tafeln. pp. 13–26.

Pontocrates norvegicus, Boeck, is described and figured in much detail, distinguished from *Pontocrates* (*Kroyera*) *arenarius*, Sp. Bate, and identified with *Kroyera altamarina*, Bate and Westwood. The genus *Pontocrates*, as defined by Boeck, is considered to be scarcely if at all distinguishable from *Monoculodes*. A very striking relationship is pointed out between *Monoculodes carinatus*, Sp. Bate, and *Pontocrates norvegicus*. Since *Monoculodes carinatus* was originally instituted as the type-species of *Kröyera*, Sp. Bate, Schneider's investigations seem to tend either to the restoration of the name *Kröyera*, with the species *carinata*, *arenaria* and *norvegica*, or to the merging of *Kröyera* and *Pontocrates* alike in *Monoculodes*. [The form *Kroyera*, instead of the earlier and more correct *Kröyera*, is uniformly used in the British Sessile-eyed Crustacea.]

Dexamine thea, Boeck, is fully described and figured. On the first maxillæ Schneider observes, "A want of symmetry in the mouth-organs is found in most Amphipoda, especially in the mandibles, but so irregular a pair of first maxillæ I have hitherto found only in *Dexamine*." It is apparently very like *Dexamine heibergi*, Boeck. "In regard to the telson, Boeck speaks of it as split to the root; I remarked to be sure," Schneider says, "a suture along the whole telson, but even under strong pressure could only make the points dehiscent. The third segment of the pleon is, just as in many Lysianassidæ, drawn out into a pointed, somewhat upward curved, hook, whereas Boeck expressly affirms the contrary."

Schneider prefers to retain the Dexaminæ (? Dexaminidæ), with the palpless mandibles, peculiarly unsymmetrical first maxillæ, and exunguiculate palps of the maxillipeds, as a separate family for the genera *Dexamine* and *Tritæta*, in contradistinction to the Atylidæ, with the genera *Atylus*, *Halirages*, *Calliopius*, *Amphitopsis* and *Læthoes*, "which in these respects are tolerably normal."

1885. Schneider, Robert.

Der unterirdische Gammarus von Clausthal. (*G. pulex var. subterraneus.*) Vorgelegt von Hrn Schulze am 22. October;—gedruckt im Bericht vom 3. December [St. XLIX];—ausgegeben am 10 December.) Hierzu Taf. VII. Mathematische und naturwissenschaftliche Mittheilungen aus den Sitzungsberichten der Kgl. preuss Akad. der Wissenschaften zu Berlin. Jahrg. 1885, Berlin 1885. [The cover of the separate part Heft X., December 1885, bears the date 1886.]

Dr. Schneider refers to an earlier essay on "subterrane Organismen" (Abhandlung zum Programm des Königl. Real-Gymnasiums zu Berlin. Ostern 1885), in which he had already mentioned this *Gammarus*. The summary of the present paper says that the subterranean *Gammarus* from Clausthal differs from the common form of *Gammarus pulex*, and approaches the blind cavern-form in the following points:—"1. in der absoluten Bleichheit des Körpers; 2. in der beginnenden Verkümmerung des Auges; 3. in der Form des fünften Gliedes des zweiten Greiffusspaares; 4. event. in der Streckung der Vorder-Antennen." "Dazu kommen noch die Eigenthümlichkeiten der verstärkten Kalk- und Eisenaufnahme." It is not, he says, strictly a "Mittelform," but at any rate a "Vermittelungsform." The special interest of the form lies in its occurrence in the waters of mines of which the age can be more or less definitely ascertained. "Zwischen ihr und jenem Extrem, welches der völlig blinde *G. puteanus* in seinen verschiedenen Variationen darstellt, liegt unbestritten eine ungleich weitere Kluft, als zwischen eben derselben und unseren einheimischen oberirdisch lebenden Formen. Noch für menschliche Begriffe *unendlich lange* Zeiträume müssen erforderlich sein und gewesen sein, um jene vollkommen subterran modificirte Form aus einer unserem Clausthaler Vorkommen entsprechenden Anpassungsstufe entstehen zu lassen, wenn wir bedenken, dass letztere vom Normalzustande noch nicht allzu weit differirende immerhin ein bis zwei Jahrhunderte (und vielleicht darüber) bis zu ihrem jetzigen Standpunkte gebraucht haben wird."

1885. Simon, Eugène.

Exploration scientifique de la Tunisie. Étude sur les Crustacés terrestres et fluviatiles recueillis en Tunisie en 1883, 1884 et 1885 par MM. A. Letourneux, M. Sédillot et Valery Mayet. Paris, M DCCC LXXXV.

On page 6, besides a note on *Gammarus pulex*, there is given the following description of *Gammarus tunetanus*, n. s.

"Long. 8^{mm}. *Gammari pulicis* valde affinis, differt tegumentis corporis parcius et minutissime punctatis, capite paulo longiore et antice paululum attenuato, oculis longius reniformibus supra basin antennarum paululum superantibus (in *G. pulice* brevius ovatis et supra basin antennarum non attingentibus), antennarum superiorum ramo flagelli longiore articulum flagelli 6um attingente sexarticulato, articulis 3, 4 et 5 reliquis paulo longioribus et inter se fere æquis (in *G. pulice* ramo semper triarticulato, articulo ultimo longiore setiformi, articulum flagelli 3um vix æquante), antennis inferioribus flagello breviore octoarticulato articulis

cunctis paulo longioribus quam latioribus (in *G. pulice* 10–13-articulato), segmentis caudæ ultimis ut in *G. pulice* spinis in fasciculos tres ordinatis munitis. Cætera ut in *G. pulice*.

"*Gammari locustæ* valde affinis, oculis antennisque superioribus fere similibus, sed antennarum inferiorum flagello multo breviore articulis paucioribus et fere teretibus differt (in *G. locusta* flagello robustiore paulum depresso 15–20-articulato, articulis saltem 2–5 latioribus quam longioribus)."

1885. Spencer, Walter Baldwin, born 1860 (W. E. Hoyle).

The urinary organs of the Amphipoda. *Reprinted from the Quarterly Journal of Microscopical Science for April*, 1885. London, 1885. Micr. Journ. Vol. XXV., N.S. Pl. XIII.

The views of earlier writers on these organs are stated. Mr. Spencer has investigated them specially in *Talitrus locusta*, in which the two tubes in question open at a considerable distance from the anus and run backwards instead of forwards, as in *Gammarus*, to end blindly in the last segment. Their openings into the gut are lateral, not dorsal as in *Gammarus*. In certain specimens these tubes were found to contain very definite concretions, of which Mr. Spencer says, "distilled water does not dissolve them, nor is there any uric acid present, but I have been able to clearly detect phosphoric acid, and hence they seem to differ from those found by Nebeski in *Orchestia cavimana*, where he states that they consist of carbonate of lime." The general result agrees with Mayer's view of these organs, which Mr. Spencer gives as follows:—

"Mayer has also described them in the Caprellidæ, where he states that they are well developed in Caprella, and absent, or only very feebly developed, in Protella, Proto, and Podalirius, but when present he has never found in them characteristic concretions, and is very decided in asserting that throughout the Amphipoda these diverticula, whatever may be their function and whether they contain excretionary products or not, belong morphologically to the mid and not to the hind gut, and that hence they cannot be considered as analogous to the Malpighian tubes of insecta. He states that there is always present a sharp break in the epithelium where the mid and hind gut meet, and that the chitin lining of the latter is not continued into the tubes whose epithelium resembles that of the mid, and not that of the hind gut."

1885. Stebbing, T. R. R.

Description of a new English Amphipodous Crustacean. The Annals and Magazine of Natural History for January 1885. Ser. 5. Vol. XV. Pl. II. pp. 59–62.

Cyproidia clamoniensis, n. sp. is here described and figured, and the correspondence pointed out between the genus *Cyproidia*, Haswell, 1880, and the genus *Stegoplax*, G. O. Sars, 1882. Both may have been anticipated by *Peltocoxa*, Catta. See Note on Catta, 1875.

1885. Stebbing, T. R. R.

In Narrative of the Cruise of H.M.S. Challenger. Vol. I. Second Part. London, Edinburgh, Dublin, 1885. pp. 618–622.

Figures are given of *Anlania gigantea* and *Acanthozone tricarinata*, the latter of which is now transferred to a new genus, *Acanthechinus*. In this part of the Narrative also the figure by

J. J. Wild and R. von Willemoes Suhm is reproduced, which had already appeared in the Transactions of the Linnean Society, 1875, with the designation "*Cystisoma Neptunus* (*Thaumops pellucida*)," and in The Voyage of the Challenger by Sir C. Wyville Thomson, 1877, with the designation "*Cystosoma neptuni*."

1886. Aurivillius, C. W. S.

Hafsevertebrater från nordligaste Tromsö amt och Vestfinmarken. Med 2 Taflor. Meddeladt den 10 Juni 1885. Bihang till k. Svenska vet.-akad. Handlingar. Band 11. N:o 4. Stockholm, 1886.

At page 41 it is mentioned that *Amphithopsis longicaudata*, A. Boeck, is found, as well as *Aristias tumidus*, Kroyer, and *Audania pectinata*, G. O. Sars, in the branchial sac of Ascidians. A specimen, 8 mm. long, the antennæ not included, was found in *Phallusia obliqua*, Heller. On *Megaptera boops* many specimens of *Cyamus boopis*, Lütken, were found, principally on the sides of the head, a few on the fins, and one further back on the whale's body. Curiously, out of 102 individuals only 12 were females. The largest of the male specimens was 12 mm. long, of the females 9 mm., antennæ not included.

1886. Bovallius, Carl.

Remarks on the genus Cysteosoma or Thaumatops. With one Plate. Communicated to the Roy. Swed. Academy of Sciences 1885, September 16. Stockholm, 1886. Bihang till K. Svenska Vet.-Akad. Handlingar. Band. 11. N:o 9.

Bovallius considers that Guérin's *Cystisoma* must be corrected into *Cysteosoma*, and then remarks that "as the name Cysteosoma or Cystisoma has been previously given to a genus of Coleoptera by Westwood, it must be rejected and consequently the name of Willemoës-Suhm *Thaumatops* be substituted." But in fact Westwood's genus is *Cystosoma*, and Guérin's name ought neither to be corrected nor rejected. *Thaumatops* is itself a correction of *Thaumops*, a correction already suggested in the Zoological Record for 1873, but these corrections only multiply synonyms needlessly, and are in my opinion very unjust to the founders of genera. If the niceties of classical philology must be attended to in the invention of new names, it would be better for authors to beware of Greek and Latin altogether and adopt Leach's device of throwing letters together into chance names like *Rocinela*, at the composition of which no scholar will be able to carp.

The family called by Willemoes Suhm Cystisomidæ is renamed by Bovallius Thaumatopsidæ. This, he says, "is to be ranged between the families Mimonectidæ and Phronimidæ. It also shows some relations to the family formed by the genus Tyro, Milne-Edwards." He has elsewhere shown that *Tyro* is the same as the later *Clydonia*, Dana. To *Thaumatops* he assigns four species; 1. *Thaumatops neptunus*, Guérin, 1842, under which he doubtfully includes *Thaumops pellucida* (the male), Willemoes Suhm, 1874, "Phil. Trans. Roy. Soc. Lond. vol. 163, part 3, p. 637, (the male)."; 2. *Thaumatops pellucida*, Willemoes Suhm, 1874, "Phil. Trans. Roy. Soc. vol. 163, p. i. p. 629 (non p. 638), pl. 49–50, fig. 1–9a;" 3. "*Thaumatops Lovéni*," n. s., Fig. 1–14, in which "the two first *pereional* segments are free, not coalesced," and "on the under-side of the head there is no shorter row of spines as in Th. Neptunus and Th. pellucida;" the single known specimen, in "length, 105 mm., was taken in the Indian Ocean; 4. *Thaumatops longipes*, n. s., Fig. 15–23, in which also "the two first *pereional* segments are free, not coalesced;" the

single specimen, in "length, 57 mm., was taken off the west coast of Australia;" "through the long and coarsely denticulated legs this species," Bovallius says, "is easily distinguished from the others." Detailed descriptions are given of all the four species.

Of the species described by J. C. Fabricius in 1775, under the name *Oniscus spinosus*, mention is not made.

1886. Bovallius, Carl.

Amphipoda Synopidea. With 3 Plates. (Presented to the Royal Society of Sciences of Upsala the 10th May 1886.) Upsala, 1886.

Bovallius here divides the Amphipoda into five tribes, distinguished as I. Tanaidea; II. Gammaridea; III. Synopidea; IV. Hyperiidea; V. Caprellidea. In the diagnosis the distinction between the Amphipoda Gammaridea, and the Amphipoda Synopidea, is made to depend upon the eyes and the maxillipeds; in the former the eyes are described as "*oculi* mediocres, sessiles," in the latter as "*oculi* grandes, maximam partem capitis occupantes, sessiles;" but when we compare the size of the eyes in such a species as that which has been named *Calliopius grandoculis*, with the size of the eyes in the various species assigned to *Synopia*, this distinction seems untenable; the maxillipeds of the Gammaridea are said to be "non coaliti, palpum quattuor-articulatum gerentes," while those of the Synopidea are described as "plus minusve coaliti, palpum quattuor-articulatum gerentes," but surely in both tribes the maxillipeds are coalesced at the base, and in the Gammaridea the fourth joint of the palp is occasionally wanting, as in *Normania*, Boeck, and occasionally both the third and fourth joints are absent, as in *Lafystius*, Kröyer. The further character assigned to the Gammaridea, "*urus* mediocre, triarticulatum," is not universally applicable, since in the family Dulichidæ, Dana, the uropod-bearing portion (urus) of the pleon has only two joints; and lastly, the character "*telson* sæpissime fissum," seems out of place when in so many genera the telson is not cleft.

His tribe Synopidea Bovallius divides into three families; 1. Synopidæ; 2. Trischizostomatidæ; 3. Hyperiopsidæ. He admits that the Synopidæ "resemble the true Gammarids in more points than those of the two following families do." In the diagnosis of this family, he says that "the eyes occupy the upper median part of the head, and are distinctly faceted." To the genus *Synopia*, Dana, he assigns six species, of which he gives descriptions, and, of all but the last, figures; all the species, he says, "are closely allied and seem rather to deserve the name of varieties than of species," but, "as their differences seem to be constant," he keeps them distinct under the following names; 1. *Synopia ultramarina*, Dana; 2. *Synopia caraibica*, n. s.; 3. *Synopia angustifrons*, Dana; 4. *Synopia Scheéleana*, n. s.; 5. *Synopia gracilis*, Dana; 6. *Synopia orientalis*, Kossmann. Of these *Synopia scheéleana* had long ago been figured for this Report, having been taken by the Challenger at the surface in the Pacific and elsewhere. One or two minute differences between the description by Bovallius and my own are noticed in the account of the species.

To the family Trischizostomatidæ, Sars, the genus *Trischizostoma*, Boeck, is assigned without companions, and with the single species *Trischizostoma raschii*, Boeck. New descriptions and figures are given of the adult female and young male. For my opinion on the proper name for this genus, see Note on A. Costa, 1853.

The third family Hyperiopsidæ has the single genus *Hyperiopsis*, Sars, and the one species "*Hyperiopsis Voerinoii*," Sars, the figures and details being borrowed from G. O. Sars' recent work on the Crustacea of the Norwegian North Atlantic Expedition 1876–1878.

1886. FORSSTRAND, CARL.

Det arktiska hafsområdets djurgeografiska begränsning med ledning af skalkräftornas (crustacea malacostraca) utbredning. Upsala, 1886. 55 pages and map.

It is mentioned in a note, p. 4, that L. K. Schmarda, in Die geographische Verbreitung der Thiere, Wien, 1853, calls the Arctic maritime region "Reich der Meersäugethiere und Amphipoden." The circumpolar realm is thus divided, starting eastward from Behring Strait; 1. *Amerikas ishaf*, from Behring Strait to Smith Sound and Baffin's Bay; 2. *Vestgrönlandska hafvet*, the tract of sea between the American Archipelago and mainland and Greenland; 3. *Europeiska Nordhafvet*, between East Greenland, West Finmarken and Spitzbergen; 4. *Barentz' haf*, between East Spitzbergen, Franz Joseph Land, Nova Zembla, Northern Russia and East Finmarken; 5. *Kariska hafvet*, from the east coast of Nova Zembla to Cape Chelyuskin; 6. *Sibiriens ishaf*, from Cape Chelyuskin to Behring Strait; 7. *Beaufort's haf*, the sea immediately north of Behring Strait and south of it to the Aleutian Islands and Sea of Ochotsk.

Referring to the Royal Society Manual of the Natural History, etc. of Greenland, London, 1875, containing the "*Crustacea of Greenland* by *Chr. Lütken*," he says that the West Greenland Sea has eighty species of Amphipoda, of which the following are not yet known from other seas, "*Æginа longicornis* Kr., *Cercops Holbœlli* Kr., *Cheirpides tricuspis* (Kr.), *Cyamus monodontis* Ltk., *mysticeti* Ltk. och *nodosus* Ltk., *Cyphocaris anonyx* Ltk., *Monoculodes affinis* (Bruz.) och *Paradiemisto compressa* (Goës)." At page 36 he remarks that many species, especially pelagic and surface-living animals, such as *Themisto*, *Hyperia*, and many Copepoda, may be subject to a *passive* distribution, due to marine currents. He finishes by giving a list of 304 Crustacea, of which those numbered 135 to 304 are Amphipoda, showing their distribution in the regions above-mentioned, of which he subdivides the third into "Ö. Grönland, Ishafsdjupet, Spetsbergen." He adds for comparison two other regions, Great Britain and the Baltic. To the list of species an addendum gives "*Lanceola Clausii* Boyall.," from West Greenland. Hoek's new species, 1882, are not included in the list.

1886. FOWLER, GEORGE HERBERT, born September 4, 1861 (G. H. F.).

List of the Amphipoda of the L. M. B. C. District: *in* the first Report upon the Fauna of Liverpool Bay and the neighbouring seas, written by the members of the Liverpool marine biology Committee, and edited by W. A. Herdman, D.Sc., F.L.S., &c. London, 1886. pp. 212–218. Pl. IV. fig. 1. [Proc. Lit. Phil. Soc. Liverpool. Vol. XL. Appendix.]

Forty-five species of Amphipoda are enumerated, with here and there a synonym and occasional notes by Mr. Fowler and Mr. A. O. Walker. "*Bathyporeia pelagica*, var. *robertsoni*, Sp. Bate," is separated from *Bathyporeia pilosa*, Lindström, by an accidental misapprehension. On *Dexamine spinosa*, Leach, the remark is made that "two very small specimens lack the characteristic tooth on the first antennæ, = *Dex. tenuicornis?*"; on *Gammarus locusta*, Linn., "a black form is common; the red spots on the abdominal segments are not always present;" on *Gammarus marinus*, Leach, "some specimens dredged from Welshman's Gut are apparently a variety between *G. locusta* and *G. marinus*, having the first two abdominal segments rounded off, but still not agreeing with *G. campylops* in the form of the last pair

of feet." *Podocerus falcatus*, Montagu, *Podocerus pelagicus*, Leach, and *Podocerus pulchellus*, Leach, are given as three species, but with the statement that "the last two species may be varieties of *P. falcatus*. Figure I on Plate IV. is an outline of "*Protella phasma*, Dana (young)," of which Mr. Fowler observes that "none of the characteristic spines on the back are developed except that on the head; and the palm of the second cheliped is much simpler than that of the adult, exhibiting only one, not very strong, tooth."

1886. Fowler, G. Herbert.

The Zoological Record for 1885; being Volume the twenty-second of the Record of zoological literature. London, M.DCCC.LXXXVI. Crustacea by G. Herbert Fowler, B.A., Ph.D. 29 pages.

1886. Gerstaecker, A.

Dr. H. G. Bronn's Klassen und Ordnungen des Thierreichs, wissenschaftlich dargestellt in Wort und Bild. Fortgesetzt von Dr. A. Gerstaecker. Fünfter Band. II. Abtheilung. Gliederfüssler; Arthropoda. *16. und 17. Lieferung.* Leipzig und Heidelberg, 1886. pp. 417–512.

In this part is finished the discussion of the variety of colouring found among the Amphipoda, and mention made of the correspondence in some species between the colour of the animal and its surroundings. A section, number 3, follows on *habitat*, in which the remark is made that hitherto only a single species, *Orchestia cavimana*, Heller, has been proved (by Graeffe's experiments) to have entirely given up the water and become an air-breather like the terrestrial Isopods. It is further said that of the Gammarid group hitherto only a single species, *Pherusa fucicola*, Leach, has been observed as an inhabitant of the wrack thrown up by the sea. But surely the common Gammari, *locusta* and *marinus*, are much more frequently found in such circumstances than *Pherusa fucicola*, which along with many other species, haunts the weeds between tide marks. Section 4 describes some of the contrivances by which Amphipoda provide themselves with dwellings, giving an account, among other matters, of the investigation by which P. Mayer discovered that *Phronima sedentaria* makes use of other animals for a residence besides *Pyrosoma*. In Section 5, on the means of boring, it is suggested that the large lower antennæ of *Chelura terebrans* may be of use in removing the gnawed-off particles of wood from the passages. Section 6 is on the period of appearance of some of the Amphipoda. Section 7, on motion, describes Gerstaecker's own observations on *Gammarus pulex*. This, he says, swims never on its side except when the shallowness of the water compels it, but otherwise almost always with the back uppermost, only occasionally and for a short time back downwards. It always swims straight forward, with the last three pairs of peræopods turned upwards, the first two pairs by their movements assisting the pleopods, the gnathopods held perfectly quiet, the antennæ for the most part kept in motion. In reference to "*Talitrus saltator*," Gerstaecker makes the suggestion that the second gnathopod may be employed in digging the hole in the sand for the creature to bury itself, though the small size and fineness of the integument of the hand of this limb are recognised as out of harmony with the suggestion. The first gnathopod would seem to be a more efficient instrument for the purpose in question. Gerstaecker suspects that the swimming movements of "*Lepidactylis* (*Sulcator*) *arenaria*" must be especially

peculiar. In fact they very much agree with those of the thin and delicate *Niphargus aquilex*. Both species are to all appearance unwilling swimmers, struggling often in a more or less upright position, then swimming back downwards, and soon sinking to the bottom. Section 8, on nourishment, gives reasons for the opinion that the Amphipoda principally if not exclusively feed on animal substances, whether dead or living. Section 9, on commensalism and parasitism, distinguishes the species which have been noticed as respectively inhabitants of Sponges, of Hydrozoa, of Echinoderms, of Tunicata, of Mollusca, of Crustacea, of Fishes, of Reptilia, of Cetacea; those on Reptilia probably belonging rather to the surface growth of sea-weeds than to the animals on which the sea-weed happens to grow. Section 10 discusses the good and harm which the Amphipoda are supposed to do, the good consisting in their constituting the food of various animals of more directly obvious importance, the harm inculpating only two species, *Chelura terebrans*, which bores into submarine timber, and *Gammarus locusta*, which is supposed to destroy fishing-nets. Section 11, on parasites, mentions as internal parasites *Echinorrhynchus polymorphus*, Brems., *Echinorrhynchus proteus*, Westr., *Distomum* sp., *Gregarina longissima*, Sieb., *Zygocystis puteana*, Lachmann, *Gregarina clausi*, Frenzel, *Callyntrochlamys phronimæ*, Frenzel, *Gregarina niceæ*, Frenzel, *Gregarina caprellæ*, Frenzel, and as external parasites "*Epistylis Steini*, Wrzesn., and *Carchesium* sp., on *Gammarus pulex*: *Podophrya cyclopum*, Clap., and *Dendrocometes paradoxus*, Stein, on *Gammarus puteanus*; *Vaginicola crystallina*, on *Gammarus marinus*; *Vorticella* sp. on *Darwinia compressa* and on *Lepidactylis arenaria*; *Carchesium* sp. and *Podophrya crustaceorum* on *Caprella æquilibra*."

Chapter V. is on classification, and begins by describing successively the systems of Milne-Edwards, Dana, Spence Bate (1857 and 1862), Lilljeborg, Boeck, Nebeski and (for the *Hyperina*) Claus, but without recognising the important service rendered by Axel Boeck in laying stress upon the mouth-organs in addition to other important parts of the structure. An interesting discussion follows bearing largely upon the Tanaidea, which it seems to be a point of honour with Gerstaecker to include under the Amphipoda. The order Amphipoda itself, as distinguished from the Isopoda, he characterises "als annähernd homonom segmentirte Malacostraca mit in der Regel selbstständigem, seltener (*Laemodipoda*, *Tanaidea*) mit dem ersten Mittelleibsring verschmolzenem Kopftheil, zwei übereinander eingelenkten Fühlerpaaren, nicht facettirtem Augen-Integument, im Mittelleib gelegenem Herzschlauch und lediglich der Ortsbewegung (nicht der Athmung) dienenden Hinterleibsbeinen."

He makes three suborders, thus defined:—

"Subordo I. Amphipoda genuina. Die sieben Mittelleibsringe frei, der erste nicht mit dem Kopftheil verschmolzen. Hinterleib normal ausgebildet, mit sieben (meist) selbstständigen Segmenten. Die Pedes spurii der drei hinteren Paare von denjenigen der drei vorderen formell verschieden. Lamellöse Kiemen nach innen oder hinten von mehreren Mittelleibsbeinpaaren.

"Subordo II. Laemodipoda. Der erste Mittelleibsring mit dem Kopftheil zu einem Cephalothorax verschmolzen. Hinterleib nebst den ihm entsprechenden Gliedmassen rudimentär, auf einen stummelförmigen Anhang des Mittelleibs reducirt. Dritter und vierter Mittelleibsring mit paarigen Kiemensäcken, dagegen nur ausnahmsweise mit regulär entwickelten Beinen versehen.

"Subordo III. Tanaidea. Der erste Mittelleibsring mit dem Kopftheil zu einem Cephalothorax verschmolzen. Hinterleib normal ausgebildet. Die Pedes spurii der fünf vorderen Paare gleich gebildet. Keine Kiemen im Anschluss an die Mittelleibsbeine. Die Seitentheile des Cephalothorax zu Athemhöhlen umgebildet."

A conspectus follows, which is not completed in this part, giving definitions of the divisions, tribes, families and most of the genera which Gerstaecker accepts. Division I. Hyperina, is

subdivided into two tribes, of which the first "Hyperina anomala, M.-Edw. (*Platyscelidæ* Claus)," follows Claus' arrangement of 1879, adding, however, *Phorcus*, M.-Edw., as a fourth genus in Fam. 3. Pronoidæ, Claus, whereas Claus, who omitted it in 1879, places it, in 1887, in the family Lycæidæ. Tribus II. Hyperina normalia, M.-Edw., is divided into three families. Fam. 1. Phronimidæ, Dana, is divided into two groups, Phrosininæ and Phroniminæ (see Note on Claus, 1879), with the suggestion that *Tryphana*, Boeck, should be included in the family Phronimidæ, the fact escaping notice that this genus had been identified by Sars with *Lycæa*, Dana, a genus belonging to the preceding tribe. Fam. 2. Hyperidæ, Dana, receives the following genera, 1. "*Themisto* Guér. (*Parathemisto* Boeck)," 2. "*Cyllopus* Dana," 3. "*Cystosoma* Guér. (*Thaumops* Willemoes)," 4. "*Tyro* M.-Edw.," 5. "*Hyperia*, Latr. (*Hiella* Straus, mas: *Lestrigonus* M.-Edw., fem: *Metoecus* Kroyer, *Tauria* Dana)," 6. "*Daira* M.-Edw. (*Dairinia* Dana)," 7. "*Mimonectes* Bovallius," with the concluding remark "hierher ferner: Gatt. *Lanceola* Say." *Cystosoma* should be written *Cystisoma*, and *Lestrigonus* is commonly regarded as the male of *Hyperia*. Fam. 3. Vibiliidæ, Dana (*Hyperina Gammaroidea* M.-Edw.), contains only the genus *Vibilia*, M.-Edw.

Division II. Gammarina, begins with "Tribus I. Corophiina (*Marcheurs* M.-Edw.)." This has five families, thus arranged :—

Fam. 1. Cheluridæ, Allm. Genus *Chelura*, Phil. (*Nemertes*, White, *Limnoria*, Hesse).

Fam. 2. Dulichiidæ, Dana (Dyopedidæ, Sp. Bate). 1. Gen. *Dulichia*, Kroyer (*Dyopedos*, Sp. Bate, *Paradulichia*, Boeck). 2. Gen. *Lætmatophilus*, Bruz. 3. Gen. *Xenodice*, Boeck. 4. Gen. *Cyrtophium*, Dana (*Platophium*, Dana).

Fam. 3. Corophiidæ, Dana. Group 1 with the rami in pairs on the first and second, single on the third uropods. 1. Gen. *Corophium*, Latr. 2. Gen. *Siphonœcetes*, Kroyer. 3. Gen. *Cerapus*, Say (*Erichthonius* and *Cerapodina*, M.-Edw., *Pyctilus*, Dana). 4. Gen. *Derrothoë*, Dana (*? Cerapus*, Say, fem.). 5. Gen. *Unciola*, Say (*Glauconome*, Kroyer). 6. Gen. *Ilela*, Boeck. Group 2 with pairs of rami on all the uropods. 7. Gen. *Podocerus*, Leach (*Jassa*, Leach, *Ischyrocerus*, Kroyer, *Cratophium*, Dana, *Elasmopus*, Costa). 8. Gen. *Gammaropsis*, Lilljeb. (*Eurystheus*, Sp. Bate). 9. Gen. *Aora*, Kroyer (*Microdeutopus*, Costa, *Autonoë*, Bruz., *Lembos* et *Lonchomerus*, Sp. Bate, *Lalaria*, Nicol.). Related genus *Xenocheira*, Haswell. 10. Gen. *Stimpsonia*, Sp. Bate. 11. Gen. *Dryope*, Sp. Bate. 12. Gen. *Cratippus*, Sp. Bate (*Colomastix*, Grube, *Ecnnguia*, Norm.) 13. Gen. *Podoceropsis*, Boeck (*Nænia*, Sp. Bate). 14. Gen. *Amphithoë*, Leach (*Anisopus*, Templet., *Pleonexes*, Sp. Bate). 15. Gen. *Synamphithoë*, White. 16. Gen. *Protomedeia*, Kroyer (*Leptocheirus*, Zadd., *Ptilocheirus*, Stimps.). As other genera belonging here, Gerstaecker adds, without numbering, *Microprotopus*, Norm., *Gossea*, Sp. Bate, *Goësia*, Boeck, *Xenoclea*, Boeck, *Haplocheira*, Haswell, and *Amphithoides*, Kossm.

Fam. 4. Icilinæ, Dana. 1. Gen. *Icilius*, Dana. 2. Gen. *Icridium*, Grube (*Percionotus*, Sp. Bate). 3. Gen. *Phlias*, Guér.

Fam. 5. Clydoninæ, Dana. Genus *Clydonia*, Dana.

Tribus II., Gammarina genuina (*Sauteurs*, M.-Edw.); begins with Fam. 6. Gammaridæ. (The branchial vesicles in subfamilies 1–5 normally developed.)

Subfam. 1. Lysianassina (et Stegocephalina), Dana. *a.* Mandibles with the cutting-edge quite or almost undentate. 1. Gen. *Lysianassa*, M.-Edw. (*Ichnopus*, Costa, *Ambasia* et *Socarnes*, Boeck. 2. Gen. *Eurytenes*, Lilljeb. 3. Gen. *Anonyx*, Krøyer (*Hippomedon*, *Aristias*, *Onisimus*, *Menigrates*, *Orchomene* et *Tryphosa*, Boeck). 4. Gen. *Opis*, Krøyer (*Normania*, Boeck). 5. Gen. *Callisoma*, Costa (*Scopelocheirus*, Sp. Bate). 6. Gen. *Acidostoma*, Lillj This is followed by three genera given as related, "verwandte Gattungen," without numbers or descriptions, namely, *Cyphocaris*, Boeck, *Epidia*, Costa, and *Glycera*, Hasw. The second group, *b.* having mandibles with dentate cutting-edge, contains 7. Gen. *Stegocephalus*, Kroyer (*Andania*, Boeck). 8. Gen. *Pontoporeia*, Krøyer (*Priscilla* et *Aryissa*, Boeck).

9. Gen. *Bathyporeia*, Lindstr. (*Thersites*, Sp. Bate). These are followed by "Verwandte Gattungen: *Amaryllis* und *Cyproidea* Hasw."

Subfam. 2. Phoxina, Sp. Bate. *a*. Upper antennæ with secondary flagellum not rudimentary. 10. Gen. *Lepidactylis*, Say (*Pterygocera*, Latr., *Subator*, Sp. Bate, *Bellia*, Sp. Bate, antea). 11. Gen. *Phoxus*, Kroyer (*Harpina*, Boeck). 12. Gen. *Urothoe*, Dana. 13. Gen. *Lilljeborgia*, Sp. Bate (*Microplax*, Lilljeb., *Cheirocratus*, Norm., *Iduna*, Boeck). 14. Gen. *Phædra*, Sp. Bate. 15. Gen. *Tiron*, Lilljeb. (*Syrrhoë*, Goës, *Tessarops*, Norm.). These are followed by "Verwandte Gattung: *Bruzelia* Boeck." *b*. Upper antennæ without secondary flagellum. 16. Gen. *Westwoodilla*, Sp. Bate. 17. Gen. *Monoculodes*, Stimps. (*Westwoodia*, Sp. Bate, *Halimedon*, Boeck). 18. Gen. *Kroyera*, Sp. Bate (*Pontocrates*, Boeck). 19. Gen. *Amphilochus*, Sp. Bate. 20. Gen. *Gitana*, Boeck. 21. Gen. *Astyra*, Boeck. 22. Gen. *Gragia*, Sp. Bate. 23. Gen. *Laphystius*, Kroyer (*Darwinia*, Sp. Bate). 24. Gen. *Œdicerus*, Kroyer (*Acanthostepheia*, Boeck). 25. Gen. *Œdiceropsis*, Lilljeb. 26. Gen. *Halicreion*, Boeck. 27. Gen. *Pleustes*, Sp. Bate (*Amphithonotus*, Costa). 28. Gen. *Iphimedia*, Rathke (*Microcheles*, Kroyer). 29. Gen. *Otlus*, Lilljeb. (*Otus*, Sp. Bate. 30. Gen. *Acanthonotus*, Owen (*Vertumnus*, White). These are followed by "Verwandte (?) Gattung: *Epimeria* Costa."

Subfam. 3. Prostomatæ, Boeck. 31. Gen. *Trischizostoma*, Boeck.

Subfam. 4. Ampeliscina, Sp. Bate. 32. Gen. *Ampelisca*, Kroyer (*Tetrommatus*, Sp. Bate, *Araneops*, Costa, *Pseudophthalmus*, Stimps.). 33. Gen. *Haploops*, Lilljeb. 34. Gen. *Byblis*, Boeck.

Subfam. 5. Gammarina. 35. Gen. *Photis*, Kroyer (*Eisladus*, Sp. Bate). 35. Gen. *Leucothoë*, Leach (*Lycesta*, Sav., *? Seba*, Costa). 37. Gen. *Stenothoë*, Dana (*Probolium*, Costa, *Montagua*, Sp. Bate, *Metopa* et *Cressa*, Boeck). "Verwandte Gattungen: *Aspidophoreia*, Hasw. und *Peltocoxa* Catta." 38. Gen. *Danaia*, Sp. Bate. "Verwandte (?) Gattung: *Callimerus* Stebbing." 39. Gen. *Pherusa* Leach (*Paramphithoë*, Bruz., *Amphithopsis*, Boeck). 40. Gen. *Calliope*, Leach (*Calliopius*, Lilljeb.). 41. Gen. *Atylus*, Leach (*Epidesura*, *Pontogeneia* et *Halirages*, Boeck, *Nototropis*, Costa). 42. Gen. *Helleria*, Norm. 43. Gen. *Dexamine*, Leach (*Lampra*, Boeck). 44. Gen. *Batea*, Fr. Müll. 45. Gen. *Brandtia*, Sp. Bate. 46. Gen. *Pardalisca*, Kroyer (*Halice*, Boeck). 47. Gen. *Nicippe*, Bruz. 48. Gen. *Eusirus*, Kroyer. 49. Gen. *Isæa*, M.-Edw. "Verwandte Gattungen: *Macheyia* und *Polycheria* Hasw." 50. Gen. *Melita*, Leach (*Ceradocus*, Costa). 51. Gen. *Mæra*, Leach (*Leptothoë*, Stimps., *Megamæra*, Sp. Bate, *Elasmopus*, Costa). 52. Gen. *Crangonyx*, Sp. Bate. 53. *Gammarella*, Sp. Bate. 54. Gen. *Niphargus*, Schioedte (*Eriopis*, Bruz.). 55. Gen. *Gammarus*, Fab. (*Goplana*, Wrzesn.). 56. Gen. *Pallasea*, Sp. Bate. 57. Gen. *Constantia*, Dybowsky. 58. Gen. *Melphidippa*, Boeck. 59. Gen. *Amathia*, Rathke (*Amathilla*, Sp. Bate). 60. Gen. *Gammaracanthus*, Sp. Bate. "Verwandte Gattungen: *Weyprechtia* Stuxberg und *Amathillopsis* Heller." Here for the present this important work makes a halt.

The above classification suggests the following comments:—

The definition of Fam. 2. Dulichidæ, Dana, includes the statements, "Das vierte und fünfte Hinterleibssegment mit einander verschmolzen; von den drei hinteren griffelförmigen Spaltbeinpaaren eines fehlend." But in *Platophium*, Dana, here given as a synonym of *Cyrtophium*, Dana, the fourth and fifth pleon-segments are not coalesced, and there are third uropods, though small and without rami.

In Fam. 3. Corophiidæ, Dana, *Cerapus*, Say, is identified with *Erichthonius*, M.-Edw., from which S. I. Smith has shown it to be distinct, and is included in the group which have pairs of rami on the first and second uropods, whereas the second uropods in *Cerapus* have single rami. *Dercothoë*, Dana, is probably the female of *Erichthonius*, certainly not the female of *Cerapus*, Say. *Hela*, Boeck, being preoccupied, has been changed into *Neohela*.

In the second group of the Corophiidæ, *Elasmopus*, Costa, is given as a synonym o *Podocerus*, Leach, but afterwards in the fifth subfamily of the Gammaridæ as a synonym of *Mæra*, Leach, to which it comes in fact much nearer. It is not easy to see why *Microdentopus*, Costa, and *Automoë*, Bruz., should become synonyms of *Aora*, Krøyer, while *Stimpsonia*, Sp. Bate, is retained as an independent genus. *Cratippus*, Sp. Bate, is of later date than *Colomastix*, Grube. The preoccupied name *Anisopus*, Templet., should rather be assigned as a synonym to *Sunamphithoë*, Sp. Bate, than to *Amphithoë*, Leach. The same may be said of *Pleonexes*, Sp. Bate, since its type species, *Pleonexes gammaroides*, is almost undoubtedly a *Sunamphithoë*. *Leptocheirus*, Zaddach, should not be made a synonym of *Protomedeia*, Krøyer; Boeck even put the two genera in different subfamilies.

In Fam. 4. Icilinæ, Dana, it should not be given as a generic character of *Icilius* that the second uropods are longer than the third; they are not so represented by Dana in the type species. If *Icridium*, Grube, is the same as *Pereionotus*, Bate and Westwood, as most probably is the case, the latter name has priority. In the definition of the family, the expression "die beiden vorderen Beinpaare von den folgenden nicht formell abweichend" is inaccurate, since, at least in *Icilius*, the gnathopods have the third joint *under-riding* the wrist.

In Fam. 5. Clydoniinæ, Dana, *Clydonia*, Dana, has recently been identified by Bovallius with *Tyro*, M.-Edw.

In Fam. 6. Gammaridæ, Subfam. 1. Lysianassina (et Stegocephalina), Dana, an attempt, with which most students will sympathise, is heroically made to reduce the number of genera, by grouping several that Boeck has established, under earlier names and comprehensive definitions. But it seems hardly just to set aside without argument results at which Boeck arrived by patient and laborious investigation. Moreover, rejected genera are very apt to make their reappearance, when fresh research and the discovery of new species makes the want of them felt, and then the earlier rejection has only the effect of complicating the synonymy. Many of Leach's genera were at one time thought superfluous, but are now firmly established. On the other hand, comprehensive definitions such as that of *Paramphithoë* by Bruzelius, are apt to introduce a confusion which it almost needs a General Council to disentangle. The preoccupied *Opis*, Kroyer, has been altered by Boeck into *Opisa*; the definition here given does not suit *Normania*, Boeck, which is made synonymous with it. *Egidia*, Costa, here given among the Lysianassina, is no doubt synonymous with *Urothoë*, Dana, given later on among the *Phoxina*, Sp. Bate. *Glycera*, Haswell, being preoccupied, has been altered to *Glycerina*.

In the second group of this subfamily, *Andania*, Boeck, is made a synonym of *Stegocephalus*, Krøyer, but I venture to think that a comparison of the mandibles shows such a combination to be impossible; on what grounds *Priscilla* and *Argissa*, Boeck, are made synonyms of *Pontoporeia*, Kroyer, I can still less understand, since the type species of these three genera are strikingly different in outward form.

In Subfam. 2. Phoxina, Sp. Bate, the definition begins with the words, "Kopf niedrig, schnabelförmig ausgezogen, den Ursprung der oberen Fühler kappenförmig überdachend." But the first genus assigned to the subfamily is *Lepidactylis*, in which there is no such hood-like prolongation of the head, the small acute rostrum being between the antennæ. A similar remark will apply to *Urothoë*, of which indeed Gerstaecker himself says, "Kopf nur kurz schnabelförmig ausgezogen," as well as to *Cheirocratus*, Norman, which is here given as a synonym of *Lilljeborgia* [rather *Liljeborgia*] Sp. Bate, although in fact it cannot in classification be placed even beside it, if any attention be paid to the mouth-organs. *Acanthonotus*, Owen, being preoccupied, has been altered by Boeck into *Acanthonotozoma*.

In Subfam. 5. Gammarina, *Cressa*, Boeck, which is given as a synonym of genus 37, *Stenothoë*, Dana, has been identified by G. O. Sars with *Danaia*, Sp. Bate. *Metopa*, Boeck, a genus in which there is a mandibular palp, is also given as a synonym of *Stenothoë*, in which the

mandible has no palp. The genus *Callimerus*, Stebbing, is a synonym of *Amphilochus*, Sp. Bate. *Calliope*, Leach, being preoccupied, must yield to *Calliopius*, Lilljeborg. Of the genera *Macleayia* and *Polycheria*, Haswell, named as genera related to *Isæa*, M.-Edw., the former is a synonym of *Tyrrellea* (see Notes on Haswell, 1880), the latter is synonymous with *Tritata*, Boeck. *Ceradocus*, Costa, in which the third uropods have both rami elongate, is here given as a synonym of *Melita*, Leach, although in regard to the third uropods of that genus it is rightly said, "ihre Innenlamelle stark verkürzt." *Goplana*, Wrzesn., is made a synonym of *Gammarus*, without notice of the curious coalescence of segments which distinguishes the former genus from the latter. *Amathia*, Rathke, being preoccupied, must give place to *Amathilla*, Sp. Bate, and not *vice versa*.

1886. Giesbrecht, W.

Zoologischer Jahresbericht für 1885. II. Abtheilung. Berlin, 1886. Crustacea. pp. 8–60.

1886. Kerville, Henri Gadeau de.

La Faune de l'estuaire de la Seine. Caen, 1886. Extrait de l'*Annuaire normand*.—Année 1886. 24 pages.

In an "aperçu de la faune actuelle de l'estuaire," the Crustacea are said to number about sixty-five species, and "parmi les plus intéressantes" are included six species of Amphipoda, none of them new. Two other species are named in the following observation, "deux espèces très affines, les *Gammarus locusta*, L. et *Gamm. pulex*, L. = *Gamm. fluviatilis*, H. Milne-Edwards, sont très abondantes dans la Seine et à son embouchure. La première de ces deux espèces, le *Gammarus locusta*, se tient constamment dans l'eau salée, tandis que le *Gammarus pulex*, très difficile à distinguer du précédent, vit à la fois, d'après mes observations, dans les eaux salées, saumâtres et douces."

1886. Koehler, R.

Contribution à l'étude de la Faune littorale des iles Anglo-normandes (Jersey, Guernesey, Herm et Sark). Art. N° 4. Annales des Sciences naturelles. Tome XX.—N°s 5 et 6. Paris, 1886. pp. 11–62.

This is practically the same paper as that already noticed in the Note on Koehler, 1885, p. 566 For "*Erysthœus odriophtalmus* Sp. B.," "*Erysthœus erythrophthalmus* Sp. B." is here read, so that *Eurystheus erythrophthalmus* is clearly intended. Some other obvious corrections of nomenclature are requisite in the lists given.

1886. Koelbel, Carl.

Crustaceen, Pycnogoniden und Arachnoideen von Jan Mayen, gesammelt von Dr. F. Fischer, Arzt der österreichischen Expedition auf Jan Mayen. Bearbeitet von Carl Koelbel. *Mit Tafel* III. *und* IV. Sonderabdruck aus dem Werke: die internationale Polarforschung 1882–1883. Die österreichische Polarstation Jan Mayen. III. Band. Wien, 1886.

Out of thirty-four species of Crustacea in the collection, seventeen were Amphipods, among which the following were conspicuous for the very large number of specimens met with:—

"*Egina spinosissima* Stimps., *Tritropis aculeata* (Lepechin), *Amathilla Sabinei* (Leach), *Gammarus locusta* (Linné), *Onesimus littoralis* (Kröyer), *Themisto libellula* (Mandt)." For these and the other species synonymy is given, with brief notes in general referring almost exclusively to measurements, depths, and the various localities from which the species are recorded.

Of "*Amathilla Sabinei*" the largest example measured, without the antennæ, 37 mm. "The young, 6 mm. long, show considerable differences from the adult, especially in regard to the antennæ, telson and uropods. The antennæ are still short and comparatively thick; the flagellum of the upper antennæ with only 6 or 7 joints, of the lower with 8 or 9; the accessory flagellum with 2. The telson is shorter than the preceding segment; the two rami of the last uropods are strikingly unequal, the inner scarcely more than a third the length of the outer. On the other hand, there is already a clear indication of the dentate dorsal carina; and on the first three pleon-segments the edges could be already perceived running obliquely downwards to the hinder angle. In the two latter points, therefore, compared with the young form described and figured by Buchholz [1874], notwithstanding the nearly equal size of the specimens examined, there was here an advance in development."

On "*Acanthozone cuspidata* (Lepechin)," Koelbel says, "For this curious species with its rows and rows of spines, Hoeck's criticisms on the figure published by Buchholz (Die zweite deutsche Nordpolfahrt, 1874, 2. B, Taf. XI.), as well in regard to the equipment of the first joint of the peduncle of the upper antennæ as also in respect to the form of the first joint in the three hinder peræopods and to the origin of the first medio-dorsal spine, are confirmed by two very large and well-preserved specimens, which were taken at a depth of 140 Metres. The first median dorsal spine arises from the front rim of the first peræon-segment, and, running almost parallel with the longitudinal axis of the body, lies with a gently undulating curve over the head, extending beyond it with the second half of its length. Also I see the hinder end of the telson with a very shallow emargination, by no means with an acute-angled slit, as figured by Buchholz." The possibility, however, should be borne in mind, that Buchholz may have had another species or a variety under examination.

1886. NORMAN, A. M.

Museum Normanianum, or a Catalogue of the Invertebrata of Europe, and the Arctic and North Atlantic Oceans, which are contained in the collection of the Rev. Canon A. M. Norman, M.A., D.C.L., F.L.S. III. Crustacea. Printed for private distribution. Houghton-le-Spring, *March*, 1886.

Four tables give the numbers of Crustacea under the following heads; "I. Total Crustacea described from the World in Milne-Edwards' Histoire des Crustacés," including Amphipoda 130, "II. Species in Milne-Edwards from the Area of this Catalogue," Amphipoda 95, "III. Species now described from the Area of this Catalogue," Amphipoda 663, "IV. Species in the collection of A. M. N.," Amphipoda 272. A preliminary remark is made that "while, on the one hand, it is certain that very many of the forms in Column III. will hereafter prove spurious or synonymous with others; on the other hand, we know little of the Amphipoda of the Western Atlantic, and nothing of the Ostracoda free living Copepoda and other smaller Crustacea of that district, and very little of those of some other parts of the area." The total number of species in Column III. is 3209, and Mr. Norman remarks that "the Crustacea is the class which undoubtedly embraces more forms than any other outside the Insecta." The species of Amphipoda referred to in Table IV.

are named on pages 13–18, and numbered from 528 to 799; though this is only a list of names, with synonyms occasionally given, it has its value for the student as showing the names preferred by an accomplished carcinologist.

1886. Perrier, Edmond.

Les Explorations sous-marines. Ouvrage illustré de 243 gravures. Bibliothèque des écoles et des familles. Paris, 1886.

On pages 194, 195, a brief popular account is given of the Amphipoda. In "Fig. 103.—*Caprelle.*—Grossie deux fois," the two antennæ are represented of equal length. It is stated that "*l'Eurytenes magellanicus*, proche parent de la Crevettine des ruisseaux, atteint sur les côtes de la Terre de Feu plus de quatre centimètres de long." But Milne-Edwards, see Note, 1848, p. 225, gives this Amphipod a length of *nine* centimetres by a depth of three.

On pages 288, 289, in illustration of "formes antiques [arctiques] d'Amphipodes dans les grands fonds," the figures of "*Eusirus cuspidatus*, Kroyer," and "*Caprella spinosissima*, Norman," from Wyville-Thomson's Depths of the Sea are reproduced. The rarity of deep-sea Amphipods is discussed, and in connection with the "Talisman" expedition, the remark is made that "une seule fois, sur les côtes du Soudan, le chalut est revenu de 655 mètres avec son filet presque entièrement couvert de Caprelles."

The contents of the concluding chapter embrace the following headings:—"La population de la mer s'appauvrit à mesure que la profondeur augmente.—Distinction entre la zone paléozoïque et la zone abyssale.—Hypothèse de Louis Agassiz.—Prétendue origine polaire de la faune des grands fonds.—Théorie de Fuchs: la faune de la lumière et la faune de l'obscurité.—Arguments en faveur de l'origine littorale de la faune profonde.—Tous les rivages ont pris part à sa formation."

1886. Pouchet, G., et Guerne, J. de.

Sur l'alimentation des Tortues marines. Comptes rendus, Paris. 12 avril 1886. 2 pages.

In the stomach of *Thalassochelys caretta*, Linné, were found among other animals "plusieurs Crustacés amphipodes (*Hyperia medusarum*), absorbés sans doute avec la Méduse dont ils étaient parasites."

1886. Robertson, David, born 1806 (D. R.).

Jottings from my Note-book. [Read 31st March, 1885.] The Proceedings and Transactions of the Natural History Society of Glasgow. Vol. I. (new series) part ii. pp. 130–132. Glasgow, 1886.

Experiments made with *Talitrus locusta* appear to show that with this species "a few hours close continement in fresh water is destructive to life." In sea-water they lived for days, and when kept for many days without food they never attacked one another. Eighteen enclosed in a thin muslin bag made no attempt to perforate. Mr. Robertson therefore questions the statements of Mr. Swain quoted by Bate and Westwood, i. p. 21, as to the *Talitri* lying piled together in cartloads, yet hopping and leaping about, devouring each other as if for very wantonness, and reducing a lady's handkerchief to a piece of open-work, apparently before it could be rescued from them.

1886. Stebbing, T. R. R.

On Crustaceans from Singapore and New Zealand. Proceedings of the Zoological Society of London, January 19, 1886. pp. 4–6.

Preliminary descriptions are given of *Byblis kallarthros*, n. s., from Singapore, and of *Talorchestia tumida*, n. s., and *Pherusa cærulea*, n. s., the two latter so named by Mr. G. M. Thomson, who discovered them in New Zealand. The suggestion that Mr. Thomson's "*Pherusa ?*" should be referred to the genus *Amphithopsis*, Boeck, is withdrawn in the full report on the species, 1887.

1886. Thomson and Chilton.

Critical List of the Crustacea Malacostraca *of New Zealand.* Part I. [*Read before the Otago Institute, 10th November*, 1885.] Transactions of the New Zealand Institute. Vol. XVIII. Art. XXXIII., pp. 141–159.

To *Tribe I.* Læmodipoda, four species are assigned, of which the fourth is given as :—

"*Cyamus ceti*, Martens (Voy. Spitzbergen, 1671), etc., etc. Chilton (Trans. N. Z. Inst., vol. xvi. p. 252).

"Hab. Parasitic on whales (*Virgia breviceps*), C. C. It appears to be common on various whales (and sharks?). I have it from several localities in the New Zealand seas, G. M. T. On small hump-backed whale, Napier, A. Hamilton."

Tribe II. Crevettina, has sixty-five species divided between three families:—

Fam. I. Corophiidæ, has species 5–17, beginning with *Corophium contractum*, Stimpson, and ending with *Iphigenia typica*, Thomson. A note on "*Corophium crassicorne*, Bruzelius," says, "This species is taken along with *C. contractum*, and it is probable that they are only male and female of the same species. *C. Bonnellii* (Milne-Edwards) is probably the same as *C. contractum*.—C. C."

Fam. II. Orchestiidæ, begins with species 18, *Nicea neo-zelanica*, and ends with species 32, *Talitrus brevicornis*, M.-Edw. "Following Professor von Martens' suggestion," the authors say, "the specific name *neo-zelanicus* has been adopted in place of all the various forms of the word meaning 'of' or 'from New Zealand.'" Accordingly they change *Allorchestes novi-zealandiæ*, Dana, into *Allorchestes neo-zelanica*, and *Nicea noræ-zealandiæ*, Thomson, into *Nicea neo-zelanica*. But these changes in my opinion are neither lawful nor expedient.

Fam. III. Gammaridæ, begins with species 33, *Gammarus fragilis*, Chilton, and ends with species 69, *Probolium mirsii* (Haswell). *Pherusa noræ-zealandiæ*, Thomson, is called *Pherusa neo-zelanica*, and *Œdicerus noræ-zealandiæ*, Dana, is called *Œdicerus neo-zelanicus*. 43. *Aora typica*, Kröyer, has for synonyms "♀ *Microdentopus maculatus*, Thomson," "♂ *Microdentopus mortoni*, Haswell," "♀ *Microdentopus tenuipes*, Haswell," and "♂ *Microdentopus maculatus*, Chilton." After species 60, *Anonyx corpulentus*, Thomson, comes the following entry :—

"61–63. Lysianassa sp.

"*Lysianassa kröyeri*, Bate (Brit. Mus. Cat. Amph., p. 65, pl. 10, fig. 4). Thomson (Trans. N. Z. Inst. vol. xi., p. 237).

"The above identification is extremely doubtful; the species referred to it has been found at Dunedin Harbour and Stewart Island, G. M. T. I have at least three species of the genus from Lyttelton and elsewhere, none of them referable to *L. kröyeri* without considerable doubt, C. C. [Descriptions of these are not published pending the publication of the *Challenger* report on the Amphipoda.]

"[In the 'Zool. Coll. of H.M.S. *Alert*,' p. 312, Mr. Miers refers to this genus and species as *Ephippiphora krögeri* (White), the original designation. Meanwhile the limits of the genus and the characters of the species require complete revision]." Compare Note on Miers, 1884.

To *Tribe III.* Hyperina, two families are assigned, embracing between them five species.

Fam. I. Phronimidæ, contains *Phronima neo-zelanica*, altered from *Phronima novæ-zealandiæ*, Powell, and *Themisto antarctica*, Dana, for which see Note on Thomson, 1879.

Fam. II. Platyscelidæ, receives the species *Platyscelus intermedius*, Thomson, *Oxycephalus edwardsii*, Thomson, and *Phreatoicus typicus*, Chilton, with the following remarks upon the last:—"The systematic position of this singular crustacean is doubtful. In general appearance, I was inclined to place it among the *Amphipoda*, but from the fact of the first five pairs of *pleopoda* acting as branchial organs, and from the absence of any such organs attached to the pereion, Mr. Chilton places it among the *Isopoda*.—G.M.T." The list continues with "*Subordor II.*—Isopoda. *Tribe I.* Anisopoda. *Fam. I.* Tanaidæ," and probably the affinities of *Phreatoicus* will eventually prove to be rather with the Tanaidæ than with the Hyperina. I do not know what are the special reasons for classing it among the Platyscelidæ.

1887. Barrois, Théodore Charles, born February 10, 1857 (T. C. B.).

Note sur quelques points de la morphologie des Orchesties suivie d'une liste succincte des amphipodes du Boulonnais. Lille, 1887. 20 pages, with plate.

The various forms assumed by the second gnathopods of *Orchestia deshayesi*, Audouin, are described and figured. The lower antennæ in that species have calceoli, whereas in "*Orchestia littorea* Montagu," Blanc's observation that they are not to be found is confirmed. *Orchestia brevidigitata*, Bate and Westwood, is shown to be in all probability only a young, though somewhat abnormal, form of *Orchestia littorea*. The list of species includes three Orchestidæ, eleven Gammaridæ, nine Corophiidæ, two Hyperidæ, four "Læmodipodes," but it is recognised that several of the names given are probably synonyms.

1887. Bovallius, C.

Systematical List of the Amphipoda Hyperiidea. Communicated to the Royal Swedish Academy of Sciences, 1885. Dec. 9. Bihang till K. Svenska Vet.-Akad. Handlingar. Band. 11. N:o 16. Stockholm, 1887. 50 pages.

For the group Bovallius gives the following diagnosis:—

"Head free, not coalesced with the first pereional segment.

"Eyes mostly large, often occupying the whole surface of the head.

"First pair of antennæ without secondary flagellum.

"Maxillipeds coalesced into a kind of operculum, without palps.

"Uropoda more or less laminar, forming natatory organs.

"Telson undivided."

The expression "more or less laminar" applied to the uropoda will only be accurate if understood to include some forms that are narrowly elongate and some that are prismatic. The group is divided into sixteen families, thus:—

Fam. 1. Tyronidæ.

Gen. 1. *Tyro*, M.-Edw., 1840, with ten species, definitions being given of *Tyro cornigera*, M.-Edw., 1830, *Tyro pacifica*, n. s., *Tyro marginata*, Bovallius, 1885.

Fam. 2. Lanceolidæ.

Gen. 1. *Lanceola*, Say, 1818, with six species, omitting Bovallius' own *Lanceola curticeps*, 1885, and changing "*Lanceola Clausii*," Bovallius, 1885, into "*Lanceola Clausi*."

Fam. 3. Vibilidæ, Claus, 1872.

Gen. 1. *Vibilia*, M.-Edw., 1830, with fifteen species, definitions being given of *Vibilia macropis*, n. s., *Vibilia gibbosa*, n. s., *Vibilia robusta*, n. s., "*Vibilia Kroeyeri*," n. s., *Vibilia longipes*, n. s., *Vibilia viatrix*, n. s., *Vibilia gracilis*, n. s., *Vibilia gracilenta*, n. s., *Vibilia armata*, n. s., *Vibilia pyripes*, n. s.

Fam. 4. Cyllopodidæ.

Gen. 1. *Cyllopus*, Dana, 1852, with six species, of which the first is *Cyllopus magellanicus*, Dana, 1852, the second "*Cyllopus Batei*," a new name for the *Cyllopus magellanicus*, so called by Spence-Bate. *Cyllopus armatus*, n. s., and *Cyllopus levis*, n. s., are described. The genus *Cyllopus* is followed by "? Gen. 2. *Cyllias*, n. g. *Typus:* Hyperia tricuspidata, Streets," thus defined :—

"Head large, irregularly quadrangular from a lateral view. Flagellum of first pair of antennæ ovate, acute at the apex. Carpus of first pair of pereiopoda dilated, twice as broad as metacarpus. Carpus of second pair narrow, not produced into a process; metacarpus slightly produced into a pointed process on either side of the dactylus. Dactylus of seventh pair?" The single species is "*C. tricuspidatus*, H. Streets, 1877."

Fam. 5. Paraphronimidæ.

Gen. 1. *Paraphronima*, Claus, 1879, with five species, of which the fourth, *Paraphronima pectinata*, n. s., is described; the fifth is given as "? *P. Gaberti*, H. Milne-Edwards, 1840," the reference being to Milne-Edwards' "*Daira Gabertii*." No mention is here made of "*Paraphronima Edwardsii*," Bovallius, 1885.

"Fam. 6. Thaumatopsidæ, C. Bovallius, 1886."

"Gen. 1. *Thaumatops*, R. v. Willemoës-Suhm, 1874," with four species.

Fam. 7. Mimonectidæ, C. Bovallius, 1885.

Gen. 1. *Mimonectes*, C. Bovallius, 1885, with three species.

Fam. 8. Hyperiidæ, Dana, 1852.

Gen. 1 *Hyperia*, Latreille, 1825, with ten species, "1. *H. medusarum*, O. F. Müller, 1776;" "2. *H. Latreillei*, H. Milne-Edwards;" "3. *H. Gaudichaudi*, H. Milne-Edwards, 1840;" "4. *H. Fabrei*, H. Milne-Edwards, 1840;" "5. *H. fera*, Dana, 1852;" "6. *H. rubescens*, Dana, 1852;" "7. *H. galba*, Montagu, 1813;" "8. *H. agilis*, Dana, 1852;" [9] "*H. minuta*, Edward, 1868;" "10. ? *H. mediterranea*, A. Costa, 1865."

Gen. 2. *Iulopis*, n. g., is thus defined :—

"Body hirsute. Head very large, deeper than long. Antennæ as in Hyperia. Pereional segments raised, forming rolls. The first two pairs of pereiopoda subcheliform, the spoon-like carpal processes compressed, narrow. Carpi of third and fourth pairs not dilated. Three last pairs subequal, metacarpi short but broad. Epimerals distinct. Uropoda short and broad. Telson large." To this genus are assigned two species, "*Iulopis Lovéni*," n. s., and *Iulopis mirabilis*, n. s.

Gen. 3. *Hyperoche*, n. g., is thus defined :—

"Body smooth. Head large, deeper than long. Antennæ as in Hyperia. Pereional segments even. First two pairs of pereiopoda cheliform, the carpal processes long, knife-like. Carpi of third and fourth pairs not dilated. Last three pairs subequal, metacarpi not elongated, narrow. Epimerals distinct. Uropoda tolerably short and broad. Telson large." To this genus five species are assigned as follows:—"1. *H. Kroeyeri*, C. Bovallius, 1885;" "2. *H. abyssorum*, A. Boeck, 1870;" "3. *H. Luetkeni*, n. sp.;" "4. *H. Martinezi*, Fritz Müller, 1864;" "5. *H. prehensilis*, Spence Bate and Westwood, 1868." A definition is given of *Hyperoche Luetkeni*, the new species.

Gen. 4. *Tauria*, Dana, 1852, has one species, *Tauria macrocephala*, Dana.

Gen. 5. *Hyperiella*, n. g., is thus defined :—

"Body smooth. Head large, deeper than long, flattened anteriorly, antennæ as in Hyperia. Pereional segments even. Two first pairs of pereiopoda subcheliform, carpal processes as in Hyperia. Carpi of third and fourth pairs not dilated. Fifth pair longer than the following, with elongated metacarpus. Two last pairs with short metacarpi. Epimerals distinct. Uropoda elongated. Telson mediocre." This genus has three species, "1. *H. antarctica*, n. sp.," with a definition; "2. *H. fusca*, Dana, 1852;" "3. ? *H. pupa*, A. Costa, 1853."

Gen. 6. *Parathemisto*, A. Boeck, 1870, receives six species, "1. *P. abyssorum*, A. Boeck, 1870;" "2. *P. oblivia*, Kroeyer, 1838;" "3. *P. compressa*, A. Goës, 1865;" "4. *P. longipes*, n. *Type*. Hyperia oblivia, Spence Bate (nec Kroeyer), 1862;" "5. *P. trigona*, Dana, 1852;" "6. *P. japonica*, n. sp.," of which a definition is given.

Gen. 7. *Euthemisto*, altered from *Themisto*, Guérin, 1828, which is preoccupied, receives the following six species, "1. *E. Gaudichaudi*, Guérin, 1828;" "2. *E. libellula*, Mandt, 1822;" "3. *E. antarctica*, Dana, 1852;" "4. *E. Guerini*, Spence Bate, 1860;" "5. *E. bispinosa*, A. Boeck, 1870;" "6. *E. Nordenskiöldi*, n. sp.," which is defined.

Gen. 8. *Themistella*, n. g., is thus defined :—

"Body smooth. Head mediocre, deeper than long. First three joints of flagellum of first pair of antennæ provided with olfactory processes. The second pair like that in Hyperia. First two pairs of pereiopoda subcheliform, with narrow, gauge-shaped carpal processes. Carpi of third and fourth pairs not dilated. Fifth pair are the longest, the following decreasing in length. Metacarpi of last three pairs somewhat elongated. Epimerals not distinct. Uropoda long and narrow. Telson mediocre." This genus receives the single species, "*Th. Steenstrupi*, n. sp."

Gen. 9. *Phronimopsis*, Claus, 1879, receives two species, "1. *Ph. spinifer*, Claus, 1879;" "2. *Ph. Sarsi*, n. sp.," the new species being as usual defined.

Fam. 9. Phronimidæ, Dana, 1852, is divided into two subfamilies.

"Subfamily 1. Dairellinæ. *Diagn.* Head almost round. All the pereiopoda are simple, walking legs. Epimerals marked but not articulated."

"Gen. 1. *Dairella*, n. g.," is thus defined :—

"First and second pairs of pereiopoda simple, with straight, short dactyli. Carpi of all the pereiopoda elongated. Peduncles of uropoda very broad, with distant rami. Telson very short and broad." It receives two species, "1. *D. californica*, C. Bovallius, 1885," the reference being to Bovallius' *Paraphronima californica*; "2. *D. latissima*, n. sp."

"Subfamily 2. Phroniminæ. *Diagn.* Head conical. Fifth pair of pereiopoda are transformed into a strong prehensile organ. Epimerals coalesced with the pereional segments."

"Gen. 2. *Phronima*, Latreille, 1802," receives five species, "1. *Ph. sedentaria*, Forskål, 1775;" "2. *Ph. atlantica*, Guérin-Méneville, 1836;" "3. *Ph. Novæ Zealandiæ*, Powell, 1877;" "4. *Ph. spinosa*, n. sp.;" "5. *Ph. Colletti*, n. sp."

"Gen. 3. *Phronimella*, Claus, 1872?" has the species "1. *Ph. elongata*, Claus, 1863;" "2. *Ph. filiformis*, n. sp."

Family 10. Anchylomeridæ.

Gen. 1. *Anchylomera*, M.-Edw., 1830, with six species. "Gen. 2. *Phrosina*, Risso, 1826," receives the species "1. *Ph. seminulata* [semilunata], Risso, 1822;" "2. *Ph. Nicetensis*, H. Milne-Edwards, 1830;" "3. *Ph. longispina*, Spence Bate, 1862." Gen. 3. *Primno*, Guérin-Méneville, 1836, has the one species "*P. macropa*, Guérin-Méneville, 1836."

Fam. 11. "Phorcidæ, Spence Bate, 1860 [1862]."

Gen. 1. *Phorcus*, M.-Edw, 1830, receives the species, "1. *Ph. Reynaudi*, H. Milne-Edwards, 1830;" "2. *Ph. hyalocephalus*, Dana, 1852;" "3. *Ph. Lovéni*, n. sp." Gen. 2. *Lycæopsis*,

Claus, 1879, receives the species "1. *L. themistoides*, Claus, 1879;" "2. *L. Lindbergi*, n. sp."

Fam. 12. "Tryphenidæ, A. Boeck, 1870."

"Gen. 1. *Tryphæna*, A. Boeck, 1870," receives the species "1. *T. Malmi*, A. Boeck, 1870;" "2. *T. Nordenskiöldi*, n. sp." It will be noticed that Boeck's family Tryphanidæ and genus *Tryphæna* are here altered in spelling evidently on philological grounds, an improvement which in my opinion is both unlawful and inconvenient, as multiplying synonyms and making the authority for the names uncertain. Sars' identification of Boeck's *Tryphæna* with *Lycæa*, Dana, is tacitly rejected. Gen. 2. "*Thamyris*, Spence Bate, 1860," receives six species, "1. *Th. rapax*, Claus, 1879"; "2. *Th. globiceps*, Claus, 1879;" "3. *Th. crusculum*, Spence Bate, 1860;" "4. *Th. antipodes*, Spence Bate, 1860;" "5. *Th. inæquipes*, Dana, 1852;" "6. *Th. elegans*, n. sp." But the position of Dana's *Dairilia inæquipes* in this genus seems to warrant the transfer of all the six species to *Dairilia*, Dana, 1852, with the species *inæquipes* for the type. In Dana's work, under *Daira*, M.-Edw., for which Dana further on substituted *Dairilia*, the first species given is *Daira ? debilis*, the second is *Daira ? depressa*, the third *Daira inæquipes*. As apparently none of these belong to Milne-Edwards' genus, it is reasonable to take the species unmarked by a note of interrogation as the type of Dana's own genus.

"Gen. 3. *Thamneus*, n. g.," is thus defined:—

"Head small, depressed. Body broad, depressed. First two pairs of pereiopoda similar to those in Thamyris. Femora of fifth and sixth pair small. Seventh pair perfectly developed, with claw-formed dactylus. Telson distinctly articulating with last ural segment." This has the species "1. *Th. rostratus*, n. sp.;" "2. *Th. debilis*, Dana, 1852," the reference being to *Daira ? debilis*, Dana. Of Dana's *Daira ? depressa*, Bovallius does not seem to take account. Gen. 4. *Lycæa*, Dana, 1852, has the following seven species, "1. *L. ochracea*, Dana, 1852;" "2. *L. pulex*, Marion, 1875;" "3. *L. similis*, Claus, 1879;" "4. *L. robusta*, Claus, 1879;" "5. *L. nasuta*, Claus, 1879;" "6. *L. serrata*, Claus, 1879;" "7. *L. Stebbingi*, n. sp." It is not explained why the *Lycæa pulex* of Marion and the *Lycæa robusta* of Claus are upheld as distinct species. Gen. 4 [5]. *Paralycæa*, Claus, 1879, has the species "1. *P. gracilis*, Claus, 1879;" "2. *P. Newtoniana*, n. sp.," definitions being given of both. Gen. 5 [6]. *Pseudolycæa*, Claus, 1879, has one species, "*P. pachypoda*, Claus, 1879." Gen. 7. *Simorhynchus*, Claus, 1871, has the species, "1. *S. antennarius*, Claus, 1871;" "2. *S. Lilljeborgi*, n. sp."

Fam. 13. Oxycephalidæ, Spence Bate, 1862.

Gen. 1. *Glossocephalus*, n. g., is thus defined:—"Head anteriorly produced into a thick, rounded, tongue-shaped rostrum. Tibia, carpus, and metacarpus of fifth pair of pereiopoda very dilated, not tumid. Uropoda short and broad." This receives the species, "1. *G. Milne-Edwardsi*, n. sp.;" "2. *G. spiniger*, n. sp."

Gen. 2. *Oxycephalus*, M.-Edw., 1830, receives the species, "1. *O. piscator*, H. Milne-Edwards, 1830;" "2. *O. Clausi*, n. sp.;" "3. *O. tuberculatus*, Spence Bate, 1862;" "4. *O. pectinatus*, n. sp.;" "5. *O. latirostris*, Claus, 1879;" "6. *O. porcellus*, Claus, 1879;" "7. *O. pronoides*, n. sp.;" "8. *O. Steenstrupi*, n. sp.;" "9. *O. longiceps*, Claus, 1879;" "10. *O. typhoides*, Claus, 1879;" "11. *O. sclerotieus*, H. Streets, 1878."

Gen. 3. *Leptocotis*, Streets, 1877, has the species, "1. *L. Lindströmi*, n. sp.;" "2. *L. tenuirostris*, Claus, 1871."

Gen. 4. *Tullbergella*, n. g., is thus defined:—"Head anteriorly produced into a short, sharp, wedge-shaped rostrum. Body thick and broad. First two pairs of pereiopoda strongly chelate. Femora of fifth and sixth pairs broadly dilated. Seventh pair rudimentary. Urus and uropoda short; interior rami not coalesced with the pedunceles." This has one species, "*T. cuspidata*, n. sp."

Gen. 5. *Calamorhynchus*, H. Streets, 1878, has the one species, "*C. pellucidus*, H. Streets, 1878."

"Gen. 6. *Rhabdonectes*, n.," a name substituted for *Rhabdosoma* preoccupied, is thus defined :—

"Body very elongated, rod-like. Head elongated, with a distinct neck, and a very long, needle-shaped rostrum. Tibiæ and carpi are linear, but periodically intumesced in the female. Seventh pair rudimentary. Ovitectrices wanting. Peduncles of uropoda very elongated and narrow. Telson very long, needle-shaped."

The species assigned are "1. *Rh. armatus*, H. Milne-Edwards, 1840;" "2. *Rh. Whitei*, Spence Bate, 1862," the definitions given being inconsistent with Claus' view that the latter species is not distinct, but the male of the former. The name *Macrocephalus*, given to this genus by Spence Bate in 1858, had been used several times before, and therefore, like *Rhabdosoma*, must yield to *Rhabdonectes*.

Fam. 14. Pronoidæ, Claus, 1879.

Gen. 1. *Pronoë*, Guérin-Méneville, 1836, has the single species "*P. capito*, Guérin-Méneville, 1836." Gen. 2. *Epronoë*, Claus, 1879, has five species, "1. *E. maculata*, Claus, 1879;" "2. *E. minuta*, Claus, 1879;" "3. *E. brunnea*, Dana, 1852," (it being apparently taken for granted that *Epronoë armata*, Claus, is the same species); "4. *E. macrocephala*, n. sp.;" "5. *E. ornata*, n. sp." Gen. 2 [3]. *Amphipronoë*, Spence Bate, 1862, has the one species "*A. cuspidata*, Spence Bate, 1862." *Amphipronoë serrulata*, Streets, 1877, is not noticed. "Gen. 3 [4]. *Parapronoë*, Claus, 1879," receives four species, "1. *P. crustulum*, Claus;" "2. *P. parva*, Claus, 1879;" "3. *P. agilis*, n. sp.;" "4. *P. atlantica*, n. sp."

Fam. 15. Parascelidæ, Claus, 1879.

Gen. 1. *Thyropus*, Dana, 1852, is tacitly substituted for the genus *Tanyscelus* of Claus, and receives three species, "1. *Th. diaphanus*, Dana, 1852;" "2. *Th. sphæroma*, Claus, 1879," [this being Claus' *Tanyscelus sphæroma* (*Thyropus diaphanus*, Dana?)]; 3. "*Th. atlanticus*, n. sp."

Gen. 2. *Parascelus*, Claus, 1879, has the species "1. *P. Edwardsi*, Claus, 1879;" "2. *P. typhoides*, Claus, 1879;" "3. *P. parvus*, Claus, 1879;" "4. *P. nasutus*, n. sp."

Gen. 3. *Schizoscelus*, Claus, 1879, has the species "1. *S. ornatus*, Claus, 1879;" "2. *S. rapax*, H. Milne-Edwards, 1830," the reference being to Milne-Edwards' *Typhis rapax*.

Gen. 4. *Euscelus*, Claus, 1879, has one species, "*E. robustus*, Claus, 1879.

Fam. 16. Eutyphidæ, Dana, 1852."

"Gen. 1. *Eutyphes*, Claus, 1879," (a note on the name, with which I by no means agree, explaining that "Typhis must be corrected to Typhes"), contains five species, "1. *E. oroides*, Risso, 1816;" "2. *E. armatus*, Claus, 1879;" "3. *E. globosus*, Claus, 1879;" "4. *E. ferus*, H. Milne-Edwards, 1830," [*Typhis ferus*, M.-Edw.]; "5. *E. forfex*, n. sp."

"Gen. 2. *Dithyrus*, Dana, 1852," which Claus makes a synonym of *Eutyphis*, is here re-established as a separate genus, tacitly superseding *Hemityphis*, Claus, of which it is made to include both the species; it receives in all four species, "1. *D. faba*, Dana, 1852;" "2. *D. tenuimanus*, Claus, 1879;" "3. *D. crustulum*, Claus, 1879;" "4. *D. stellatus*, n. sp."

"Gen. 3. *Paratyphes*, Claus, 1879," has the spelling altered from *Paratyphis*, Claus. It receives the species "1. *P. maculatus*, Claus, 1879;" "2. *P. Thèdi*, n. sp."

Gen. 4. *Tetrathyrus*, Claus, 1879, has three species, "1. *T. forcipatus*, Claus, 1879;" "2. *T. rectangularis*, n. sp.;" "3. *T. inscriptus*, n. sp."

Gen. 5. *Amphithyrus*, Claus, 1879, receives four species, the fourth being "*A. inermis*, n. sp."

The new genera here constituted are nine in number, independently of those re-established or named afresh. Short descriptions are given of forty-five new species. The work contains diagnoses of the several families, which it will be more convenient to notice in the descriptive part of this Report.

1887. Bovallius, C.

Arctic and Antarctic Hyperids. With eight Plates. [Ur "Vega-expeditionens vetenskapliga iakttagelser," Bd. IV., Stockholm, 1887.] pp. 545–582.

In the introductory part Bovallius says, "In my opinion the limits of the zoo-geographical regions must be taken more generally with regard to truly pelagic animals than regarding the inhabitants of the depths and the shores. Therefore I shall fix the southern limit of the Arctic region at Lat. 60° N., and the northern limit of the Antarctic region at Lat. 50° S. Certainly a part of the Gulf Stream will thus be included within the limits of the Arctic region, but this seems to do but little harm, as is shown by the diagram of the geographical distribution of the species given below." Then tracing the history of the discovery of Arctic and Antarctic Hyperids, he says, "after reducing the various synonyms to the names, which in my opinion are the true ones, we find in the above cited literature altogether 15 species mentioned from the *arctic* region, viz., *Tyro borealis* G. O. Sars. *Lanceola Loréni* C. Bovallius. *Lanceola Clausi* C. Bovallius. *Hyperia medusarum* O. F. Müller. *Hyperia Latreillei* H. Milne-Edwards. *Hyperia galba* Montagu. *Hyperoche Kroeyeri* C. Bovallius. *Hyperoche abyssorum* A. Boeck. *Parathemisto oblivia* Kröyer. *Parathemisto compressa* A. Göes. *Parathemisto abyssorum* A. Boeck. *Euthemisto libellula* Mandt. *Euthemisto bispinosa* A. Boeck. *? Euthemisto Nordenskiöldi* C. Bovallius. *Tryphæna Malmi* A. Boeck. From the *antarctic* region 10 species, viz., *Cyllopus magellanicus* Dana. *Cyllopus Lucasi* Spence Bate. *Cyllopus Danæ*, Spence Bate. *Tauria macrocephala* Dana. *Parathemisto trigona*, Dana. *Euthemisto Gaudichaudi* Guérin. *Euthemisto antarctica*, Guérin [Dana]. *Anchylomera abbreviata* Spence Bate. *Anchylomera antipodes* Spence Bate. *Thamyris antipodes* Spence Bate." In this paper the number of the Arctic species is raised to twenty-two, and the Antarctic to thirteen.

In the descriptive part, *Clydonia borealis*, Sars, 1882, becomes *Tyro borealis*. Brief descriptions are given of "*Tyro Clausi*," Pl. 40, figs. 1–3, "*Syn.* 1885. *Tyro Clausii*, C. Bovallius;" "*Tyro Tullbergi*," Pl. 40, figs. 4–10, "*Syn.* 1885. *Tyro Tullbergii*, C. Bovallius;" "*Lanceola Clausi*," Pl. 41, figs. 11–14, "*Syn.* 1885. *Lanceola Clausii*, C. Bovallius;" "*Lanceola Loréni*, C. Bovallius," 1885; "*Lanceola serrata*, C. Bovallius," 1885; "*Vibilia Kroeyeri*, C. Bovallius," 1887; "*Cyllopus magellanicus*, Dana, 1852;" "*Cyllopus Lucasi*, Spence Bate, 1862. *Syn.* 1862. *Cyllopus Lucasii*, Spence Bate"; "*Cyllopus Danæ*, Spence Bate, 1862;" "*Cyllopus armatus*, C. Bovallius, 1887. Pl. 41, fig. 15–25;" "*Thaumatops longipes*, C. Bovallius, 1886," on which Bovallius remarks, "One specimen taken just at the southern limit of the Arctic region, at Lat. 59° 38′ N.; Long. 5° 24′ W. The other known specimen is taken off the western shore of the Australian mainland. Indeed a wide distribution for the species;" "*Mimonectes Steenstrupi*," Pl. 47, figs. 111–115. "*Syn.* 1885. *Mimonectes Steenstrupii*, C. Bovallius;" "*Hyperia medusarum*, O. F. Müller, 1776. Pl. 42, fig. 26–33;" "*Hyperia Latreillei*, H. Milne-Edwards, 1830. Pl. 42, fig. 34–39; Pl. 43, fig. 40–46; *Hyperia galba*, Montagu, 1813. Pl. 43, fig. 47–54;" "*Hyperoche Kroeyeri*, C. Bovallius, 1885," which would rather seem to be entitled to the name *Hyperoche medusarum*, since Bovallius gives as its earliest synonym "*Metoecus medusarum*, Kroyer," 1838; "*Hyperoche abyssorum*, A. Boeck, 1870. Pl. 44, fig. 55–62," the opinion of Sars, 1882, that this is the same species as the preceding, not being noticed; "*Hyperoche Luetkeni*, C. Bovallius, 1887. Pl. 44, fig. 63–71;" "*Hyperiella antarctica*, C. Bovallius, 1887. Pl. 45, fig. 72–80;" "*Parathemisto abyssorum*, A. Boeck, 1870. Pl. 45, fig. 81–89;" "*Parathemisto compressa*, A. Göes, 1865," transferred from *Themisto* by Boeck in 1870; "*Parathemisto oblivia*, Kroeyer, 1838," transferred from *Hyperia* by Bovallius in 1887; "*Parathemisto trigona*, Dana, 1852," in like manner transferred by

Bovallius from *Hyperia;* "*Euthemisto Gaudichaudi*, Guérin, 1828," with the synonym "*Euthemisto* [Themisto] *Gaudichaudii*, Guérin;" "*Euthemisto libellula*, Mandt, 1822. Pl. 46, fig. 90–96;" "*Euthemisto bispinosa*, A. Boeck, 1870. Pl. 46, fig. 97–103;" "*Euthemisto antarctica*, Dana, 1852;" "*Euthemisto Nordenskiöldi*, C. Bovallius," 1887, with the synonym "*Euthemisto Nordenskiöldii*, C. Bovallius," 1887, the observation being made that "possibly the *Hyperia Cyaneæ* Spence Bate (not Sabine) is identical with this species;" "*Anchylomera abbreviata*, Guérin-Méneville, 1836;" "*Anchylomera antipodes*, Spence Bate, 1862;" "*Tryphæna Malmi*, A. Boeck, 1870," with the synonyms "*Tryphana Malmii*, A. Boeck," and "*Lycæa Malmii*, G. O. Sars;" "*Tryphæna Nordenskiöldi*, C. Bovallius, 1887;" "*Thamyris antipodes*, Spence Bate, 1862."

As far as Bovallius has himself observed, the Arctic and Antarctic Hyperids do not include species of the Paraphronimidæ, Phronimidæ, Phorcidæ, Oxycephalidæ, Pronoidæ, Scelidæ, or Typhidæ. From his whole review he draws the conclusions, that:—

"1:o) the genus *Euthemisto* (and possibly also *Hyperia*) is common to both the arctic and the antarctic regions; as it has only few representatives in the Northern and Southern temperate regions and none in the tropical, its centra of development are most likely to be searched for in both the frigid zones;

"2:o) the genus *Lanceola* is a true arctic form with only a few emigrants in the Northern temperate region;

"3:o) the genera *Hyperia* and *Parathemisto* are cosmopolites, probably to be found in all the seas;

"4:o) the genus *Cyllopus* is a true antarctic form with its centre in the American Antarctic Ocean;

"5:o) the genus *Hyperiella* is a connecting link between *Hyperia* and *Euthemisto*, with same centre as *Cyllopus;*

"6:o) the genus *Hyperoche* is an arctic form with its centre in the European Arctic Ocean;

"7:o) the genera *Vibilia*, *Thaumatops*, *Mimonectes* and *Tryphæna* are occasional immigrants into the arctic region from the tropical and temperate regions, probably to be found occasionally also in the antarctic region (except *Mimonectes*);

"8:o) the genera *Anchylomera* and *Thamyris* are occasional immigrants into the antarctic region, not likely to be found in the arctic realm."

The Challenger collection, I may observe, shows the genus *Lanceola* to have an immensely wider range than that given above. One specimen was obtained, along with a specimen of *Phronima*, in lat. 50° 1′ S.; another specimen was taken in lat. 8° 37′ S. Bovallius himself records *Lanceola curticeps* from Cape Verde Islands and *Lanceola felina* from Tristan da Cunha. The genus *Hyperoche* is represented at the Cape of Good Hope.

For *Hyperia medusarum*, O. F. Müller, the following synonymy is given:—*Pulex cancriformis antennis brevissimis*, H. Ström, 1762; *Cancer medusarum*, O. F. Müller, 1776; *Gammarus medusarum* [O. F. Müller], J. C. Fabricius, 1779; *Phronima*, Latreille, 1818; *Talitrus cyaneæ*, Sabine, 1824; "*Hyperia Lesueurii*, Latreille," in Desmarest, 1825, and in Milne-Edwards, 1840; *Hyperia spinipes*, A. Boeck, 1861 [1860] and 1872; *Hyperia exulans*, var., A. Goës, 1866 [1865].

To *Hyperia Latreillei*, M.-Edw., 1830, the synonyms assigned are *Lestrigonus exulans*, Krøyer. 1838; *Hyperia Latreillei*, M.-Edw., 1840; "*Hyperia galba* [Montagu] Spence Bate," 1862; "*Lestrigonus Kinahani.* Spence Bate," 1862; *Hyperia exulans*, Kroeyer (e. p.). Goës," 1865; "*Lestrigonus Kinahani.* Spence Bate," in Bate and Westwood, 1868; "*Hyperia medusarum* [O. F. Müller.] A. Boeck," 1872.

To *Hyperia galba*, Montagu, 1813, the synonyms given are "*Hyperia galba*, Montagu," 1813, (which should rather be *Cancer Gammarus galba*); "*Lestrigonus exulans.* [Kroeyer]. Spence Bate," 1862; "*Hyperia medusarum* [O. Fabricius] Spence Bate," 1862; "*Lestrigonus*

exulans. [Kroeyer]. Spence Bate and Westwood," 1868 [1863]; "*Hyperia galba*. Montagu. Spence Bate and Westwood," 1868 [1863].

To "*Hyperoche Kroeyeri*, C. Bovallius," the synonyms are *Metoecus medusarum*, Kroyer, 1838; *Hyperia medusarum* (O. Fabr.). Spence Bate, 1862; *Metoecus medusarum* (O. Fabr.), A. Boeck, 1870; *Touria medusarum* (O. Fabr.), A. Boeck, 1872; "*Hyperia Kroeyeri*, C. Bovallius," 1885. Thus Bate's *Hyperia medusarum* is cited for two genera.

1887. Chevreux, Édouard.

Sur les Crustacés amphipodes de la côte ouest de Bretagne. 3 Janvier 1887. Paris. ("Communication faite à l'Académie de Paris, le 3 Janvier 1887.")

A short account is given of Amphipods obtained on the coast or by dredging "entre la pointe de Penmarch et l'embouchure de la Loire," an extent of about 100 marine miles. "La baie du Croisic" was specially examined, a locality prolific in forms in proportion to the varied nature of the ground which its waters cover. *Elasmopus latipes*, Boeck, was found by M. Chevreux to be a commensal of *Maia squinado*, together with *Ixea montagui*, M.-Edwards. Twenty other species, he says, are found more or less often on this crab. The total number of known species obtained in the region examined amounted to 115, to which are to be added three new forms, briefly described under the names *Ptilocheirus tricristatus*, *Microprotopus longimanus*, *Microdentopus armatus*. The last of these appears to come very near to *Stimpsonia chelifera*, Sp. Bate; see Ann. and Mag. Nat. Hist., ser. 5, vol. i. pl. v., 1878.

Incidentally "*Stenothoe monoculoides* Mont., *Atylus Swammerdamii* Milne-Edwards, *Amathilla Sabini* Leach" are recorded from the coast of Algeria.

1887. Chevreux, Édouard, et Guerne, Jules de.

Notes sur les Amphipodes des Côtes de France. (Extrait des *Procès-verbaux des séances de la Société Zoologique de France*, t. XI. séance du 28 décembre 1886.)

Fuller descriptions are here given by M. Chevreux of *Ptilocheirus tricristatus*, n. s., *Microprotopus longimanus*, n. s., and *Microdentopus armatus*, n. s., from the south-west of Brittany. M. de Guerne gives a list of thirty species of Amphipods from the north of France, but he notes that the *Podocerus falcatus*, Montagu, and the *Janassa variegata*, Leach, which he includes in the number mentioned, are regarded by Nebeski as the male and female of a single species. In my opinion the *Amphithoë podoceroides*, Rathke, and *Amphithoë rubricata*, Montagu, are also a single species, though some specimens are green and others red. Probably also the species named in the list *Podoceropsis rimapalmata*, Sp. Bate, and *Podoceropsis excavata*, Sp. Bate, are identical.

1887. Chevreux, E.

Catalogue des Crustacés Amphipodes marins du Sud-ouest de la Bretagne, suivi d'un aperçu de la distribution géographique des Amphipodes sur les côtes de France. (Planche V.). Extrait du Bulletin de la Société Zoologique de France. t. XII. 1887. Paris, 1887. 54 pages.

Among the weeds and Hydroid zoophytes which commonly grow on the carapace of *Maia squinado*, M. Chevreux has been able to discover no less than twenty-three species of

Amphipods, the list beginning with "*Isæa Montagui* Edw." and "*Laphystius sturionis* Kröy.," and ending with "*Podalirius typicus* Kröy." Altogether the Catalogue enumerates 123 species, with notes principally on synonymy and locality. *Bathyporeia robertsoni*, Spence Bate, is upheld as a distinct species, with the remark that "chez ce dernier type, et quelle que soit sa taille, les articles du fouet des antennes inférieures sont assez allongés, et garnis de volumineuses baguettes olfactives, tandis que chez les *B. pelagica* de toutes tailles, ils sont extrêmement courts et ne présentent pas de baguettes olfactives bien apparentes." This distinction between specimens, however interesting in itself, is not, I think, of specific importance apart from other distinguishing characters. On *Urothoë marina*, Sp. Bate, M. Chevreux observes, "c'est certainement à tort que Meinert considère *U. marina* comme le mâle d'*U. brevicornis* Sp. Bate; chez toutes les *Urothoe*, les mâles se distinguent des femelles par leurs longues antennes inférieures. M. le Professeur Giard a signalé, il y a longtemps déjà, ce caractère sexuel. J'ai trouvé du reste un certain nombre d'*U. marina* portant des œufs." Of *Urothoë elegans*, Sp. Bate, he says, "c'est très probablement la forme mâle d'*U. marina*."

Of *Monoculodes longimanus*, Bate and Westwood, the antennæ are described and figured, Pl. V. figs. 1–2, and the suggestion is made that this species ought perhaps to be placed in a new genus.

"Guernea, nov. gen." in place of *Helleria*, Norman, preoccupied, is thus defined:—"*Antennæ superiores flagello appendiculari instructæ. Pedes 1^mi et 2^di paris manu subchelliformi. Pedes 7^mi paris setis longis plumosis instructi. Segmentum abdominis 5^tum et 6^tum coalita. Pedes saltatorii ultimi paris 2 ramosi. Appendix caudalis laminæformis, profunde fissa.*" Of the type species, "*Guernea coalita* Norman," figures are given in the text on page 5, though referring to the description of the female on page 16.

Of *Elasmopus latipes*, Boeck, found on *Maia squinado*, it is remarked, page 21, that the male differs from the female (which Boeck describes) in the hand of the second gnathopods, which is much larger, and carries two or three large obtuse teeth on the lower margin, while in the female it is smooth. The hand of the male is represented, fig. 3, on page 6.

Protomedeia pectinata, Norman, and *Protomedeia hirsutimanus*, Spence Bate, are here referred to the genus *Ptilocheirus*, Stimpson.

Ptilocheirus tricristatus, n. s., is described at some length, parts of it being represented on page 6, fig. 4, and on Pl. V. figs. 3, 4.

Microprotopus longimanus, n. s., is likewise described, with illustrative figures on Pl. V. figs. 5–10, and fig. 5 on page 8 of the text.

Of *Microdeutopus armatus*, n. s., the two sexes are described, and illustrated by fig. 6 and fig. 7 on page 9 of the text, and Pl. V. figs. 6, 7.

Boeck's *Janassa variegata*, Leach, is here regarded as an independent species, with "♂ *Podocerus capillatus* Sp. Bate and Westwood," for a synonym.

Under "*Erichthonius* Edwards," a species is entered as "*Erichthonius abditus* Templeton, Trans. Ent. Soc. (*Cerapus*).—Sp. Bate and Westwood, *Brit. sess. Crust.* (*Cerapus*).

"*E. bidens*, Costa, *Cros. amfip. del. Regno di Napoli.*

"♀ *Dercothoe punctatus* Sp. Bate and Westwood, *Brit. sess. Crust.*;" and a second species as,

"*E. difformis* Edwards, *Hist. des Crust.*—Sp. Bate and Westwood, *Brit. sess. Crust.* (*Cerapus*)."

But from Templeton's description of the tube and habits of his species, it is probable that he had in view a true species of *Cerapus*. On the other hand I believe that the forms named respectively *Cerapus abditus*, *Cerapus difformis*, and *Dercothoë* (*Cerapus* ♀) *punctatus*, in the British Sessile-eyed Crustacea, are all synonyms of *Erichthonius difformis*, Milne-Edwards. I have found them all at Ilfracombe nesting together on tufts of *Chondrus crispus* in the same small rock-pool. There can be little doubt that the so-called *Cerapus abditus* of this family group is the most fully developed male; *Dercothoë punctatus* is

certainly the female, and *Cerapus difformis* is probably the male in a less advanced stage, or possibly a form assumed between the pairing seasons. The account given by Gosse of the tubes of his "*Cerapus Whitei*" taken at Ilfracombe (see Notes on Gosse, 1853 and 1855, and Brit. Sess. Crust., i. p. 468) induces me to suppose that his species ought not to be referred to *Siphonœcetes* but to be made an additional synonym of *Erichthonius difformis*.

Dryope irrorata, Sp. Bate, and *Dryope crenatipalmata*, Sp. Bate, are entered as separate species, but recognised as "deux formes très voisines." The fact that they were dredged together tends to confirm my opinion that they are forms of a single species.

In the Second Part, M. Chevreux gives, he says, "un résumé de tous les documents que j'ai pu réunir sur la répartition géographique des Amphipodes de nos côtes." In the notes he observes that Sp. Bate has not described any species of the name *Megamæra subserrulata*, as in Grube's list from Saint-Vaast-la-Hongue, 1869. Grube no doubt intended the species *Megamæra semiserrata*, Sp. Bate. Of the existence of the true *Microdeutopus anomalus* on the French coasts M. Chevreux is not certain; but in regard to the females of the genera *Microdeutopus*, *Aora*, and *Stimpsonia*, he promises soon to publish differentiating characters, based on the examination of living specimens at the moment of reproduction.

In "la liste des Amphipodes recueillis sur le littoral des Alpes-Maritimes par M. Adrien Dollfus," two new species are included :—"*Stenothoe Dollfusi* n. sp.," thus described :—"*Antennæ prælongatæ, subæquales; etiam inferiores flagellum elongatum gerentes. Pedes 2di paris manu elongata, plus quam duplo longiore quam lata, palma valde excavata, in parte anteriore dentibus duobus instructa* (fig. 8)," on page 10 of the text.

"*Guernea lævis* n. sp." thus described :—"G. coalitæ *valde affinis, sed carina segmentorum abdominis duorum posteriorum non denticulata differt.*" If there be no other distinction between the species than that here mentioned, I should be inclined to regard *Guernea lævis* as a synonym of *Guernea coalita*.

The "relevé général de nos espèces de la Méditerranée" includes the names of 75 species, beginning with "*Vibilia Jeangerardi* Lucas" and ending with "*Cyamus ceti*."

The "Distribution géographique et bathymétrique" is given in a tabular form, the "liste des espèces marines signalées sur les côtes de France" in this table numbering 174. As to the bathymetric distribution M. Chevreux says, "Enfin, le fait le plus frappant est la capture par l'*Expedition Norvégienne* 1876–1878, de l'*Hippomedon Holbolli*, dragué par 1215 brasses (2284 m.) de profondeur. Cette forme ne diffère de celle qui habite les fonds de 5 à 10 m. de la baie du Croisic que par l'absence des organes de vision." He remarks in a note that adult specimens of *Podocerus falcatus*, *Amphithoe rubricata*, and *Proto ventricosa* coming from depths of 80 to 100 m. are much smaller than shore-specimens; but this observation cannot, I think, have any very general application.

The "Index bibliographique" contains sixty-six entries, beginning with Risso, 1816, and ending with J. de Guerne, 1887.

1887. Claus, C.

Die Platysceliden. Mit 26 lithographirten Tafeln. Wien, 1887.

The preface notices that hitherto sufficient attention has not been paid to sexual dimorphism and metamorphosis occurring in the Hyperina, and that accurate details in regard to the mouth-organs and inner structure of the Platyscelidæ have been entirely wanting.

The description of families, genera and species, pages 30 to 75, corresponds closely with that already published by Claus in 1879; see Note on Claus under that date. But the value of that description is here enormously increased by the addition of the beautifully executed and highly instructive plates.

The introduction, pages 3 to 29, comprises eight sections, as follows:—

1. Allgemeine Charaktere. Among these are noted the very striking differences presented by the antennæ in the two sexes, the absence of palp-appendages from the maxillæ as well as the maxillipeds, and the limitation of the triarticulate mandibular palp to the male sex.
2. Aeussere Erscheinung und Körperform. Claus knows of no instance in this group in which the epimera or side-plates are absorbed in the segment as in the *Phronima*-group. The fifth and sixth pleon-segments are always coalesced, and sometimes the telson is united to them without suture.
3. Gliedmassen. The upper or front antennæ never have an accessory flagellum; observers have been misled by the produced peduncle in *Phorcus* to regard the principal flagellum as accessory. The second or hinder antennæ have the peduncle and flagellum not sharply defined the one from the other. In almost all cases the first or coxal joint is absorbed into the integument of the head. Claus notices that there are fine setæ along all the joints except the first of the folding antennæ of the male, but of their function he is not quite certain. The left mandible has a tooth-like process of considerable size, which is either absent or as a rule very weakly indicated on the right mandible. The first joint of the mandibular palp, which is generally small in the Gammarina, is generally large, and sometimes enormous, in the Platyscelidæ. For the terminal part of the gnathopods various expressions are used, *Greifhand* (*Zange*) for a subchelate, *Scheere* for a chelate, hand and finger, *doppelte Scheere* when the chelate hand and finger are applied against an immovable process of the wrist, and *zusammengesetzte Scheere* when the chela is formed by a simple hand and finger applied against the process of the wrist. The marsupial plates of the female are generally lanceolate, yet widening at the free end, and occasionally so much so as to be like a stalked leaf.
4. Integument und Hautdrüsen.
5. Nervensystem und Sinnesorgane. The ganglia of the first two peræon-segments are drawn together and taken up into the group of the subœsophageal ganglion. The last peræon-ganglion is relatively small and united with the preceding, while the fourth pleon-ganglion, which provides for the hinder section of the pleon and in the Gammarina remains separate, is much reduced, united with the third ganglion, and placed in the third pleon-segment. In the more elongate species lateral nerves issue not only from the ganglion-masses, but also from the longitudinal commissures in the peræon-part of the ganglionic chain. In the genera *Eutyphis*, *Thamyris*, *Simorhynchus*, and the Oxycephalidæ there are centrally from the origin of the great front antennary nerves two short nerves, each of which provides for a sense-organ lying just in front of the brain, which is evidently an organ of hearing. The contents of the vesicle in question are a clear watery fluid and what is obviously an otolith.

Of the eyes Claus says:—"Eine Facettenbildung der Cuticularbekleidung habe ich in keinem Falle beobachtet, vielmehr bildet, wie bei *Phronima*, die zarte durchsichtige Körperdecke über dem Auge eine gleichmässige Cornea. Immerhin tritt bei tiefer Einstellung eine sechsseitige facettenähnliche Felderung hervor, bedingt durch den optischen Querschnitt der paarigen Krystallkegelzellen, deren zwei grosse Kerne erhalten bleiben. Oberhalb der Krystallkegelzellen breitet sich eine deutlich nachweisbare Hypodermis als Matrix der Cornea aus, welche der schon von *Claparède* vertretenen und von *Grenacher* aufrecht erhaltenen Auffassung entgegensteht, nach welcher überall die Bildungzellen der Krystallkegel (mit den Semper'schen Kernen) zugleich die Matrixzellen der Chitinhaut seien."

On the Spürfäden or Riechhaare he says that here and there the end is open in consequence of the breaking off of the point, and that this may have led to the erroneous view "als besässen die Riechhaare an der Spitze Oeffnungen." For the latter view see Note on Leydig, 1878, with whom Hoek, 1879, agrees.

6. Darmcanal und Anhangsdrüsen. Among many other statements of importance, Claus says, "der Mitteldarm, in welchen der Vormagen oft mit verengtem Trichter einführt, beginnt überall mit der Einmündung eines einzigen Paares von Leberschläuchen, dereu Umfang und Form im Verhältniss zu dem medianen Darmrohre mannigfach wechselt," and "Anhänge des Afterdarmes oder am Ende des Mitteldarmes sind mir in keiner Gattung bekannt geworden."
7. Herz, Gefäss-system und Athmung. In the Platyscelidæ the heart has only two pairs of venous ostia, the slits being wanting in the second peræon-segment; besides the two aortas it has three pairs of lateral arteries, occurring respectively in the third, fourth and fifth segments.

Of the branchial vesicles Claus says, "mit Ausnahme der männlichen *Rhabdosomen*, welche nur zwei Paare von Kiemen am fünften und sechsten Beinpaare der Brust tragen, finde ich die Fünfzahl der Kiemenpaare überall eingehalten." *Lycæopsis*, as Claus himself subsequently shows, is another exception, but whether that genus should hold a position among the Platyscelidæ he is doubtful. Bovallius places it in the family Phorcidæ.

8. Geschlechtsorgane. Entwicklung. Claus mentions by the way that he is unable to corroborate the statement of Fr. Müller that the young of *Hyperia* leave the egg-sheath without abdominal feet. From a comparison of young with adult forms he draws the conclusion that the Hyperidæ have developed from the Gammarina, and that from the Hyperidæ have sprung the Platyscelidæ as an aberrant offshoot.

1887. Hansen, H. J., and Holm, Th.

Oversigt over de paa Dijmphna-Togtet indsamlede Krebsdyr af H. J. Hansen, *in* Dijmphna-Togtets zoologisk-botanische Udbytte. Avec des résumés en français. Udgivet paa Bekostning af Ministeriet for Kirke- og Undervisningsvaesenet af Kjøbenhavns Universitets zoologiske Museum ved Dr Chr. Fr. Lütken. Kjøbenhavn, 1887.

The account of the Amphipoda extends from page 210 to page 234, and is illustrated on Plates XXI. and XXII., of which the *explicatio* is given on pages 282, 283. Spence Bate's view is adopted that the so-called epimera are the first joints of the thoracal legs, the joints of which are accordingly in the descriptions numbered from one to seven, not, as many authors prefer, from one to six. Forty-one species are mentioned. *Onisimus caricus*, n. s. (Tab. xxi, Fig. 6–6*e*), is said to be very near to *Onisimus edwardsii*, Krøyer (Tab. xxi, Fig. 8, 8*a*), but distinguished from it by its superior size, and among other things especially by the second gnathopods, thus described, "in utroque sexu articulo sexto quam articulo quinto vix duplo breviore, subtriangulo, ad apicem versus nonnihil dilatato, dimidio longiore quam latiore, margine anteriore quam posteriore nonnihil longiore, apice emarginato; unguis (e articulo septimo et ungue vero formato) sat robusto, valde curvato, ut intervallum inter unguem et articulum sextum præstet." Besides the differences of the antennæ in the male, female, and young of the Lysianassidæ, Dr. Hansen says that much difference may be found between the second gnathopod of the male and that of the female. This he illustrates by *Onisimus brevicaudatus*, n. s. (Tab. xxi, Fig. 7–7*e*), in which the female has the second gnathopod nearly as in the closely allied *Onisimus caricus*, while in this limb of the male "articulus sextus alio modo formatus est, non triangulus, marginibus ad apicem versus subparallelis, apice oblique truncato, ut margo anterior brevior quam margo posterior evadat, 'ungue' breviore et graciliore in medio margine apicali sito." *Onisimus affinis*, n. s. (Tab. xxi, Fig. 9, 9*a*), is said to be very near to *Onisimus edwardsii*, the distinctions being apparently only drawn from measurements of

the second gnathopods and telson. "*Eusirus Holmii*, n. s. (Tab. xxii, Fig. 1–1*b*), is said to be very like *Eusirus cuspidatus* in respect to the carina and dentation of the back and in the form of the hands, while it much resembles *Eusirus longipes* by the length of its legs, which, however, are considerably longer than in the last-named species, but it is said to differ from both the species mentioned by its specially long upper antennæ, by the size and form of the three first pairs of epimera, and in several other respects. The length of an adult female was 53 mm. *Microdentopus arcticus*, n. s. (Tab. xxii, Fig. 3), is also remarkable for its size, attaining a length of 29 mm. Dr. Hansen was under the impression moreover that none of his specimens were full grown.

A description and figures are given (Tab. xxi, Fig. 5–5*c*) of the maxillæ and maxillipeds of *Socarnes bidenticulatus* (Sp. Bate). Of "*Stegocephalus ampulla* (Phipps) (Tab. xxi, Fig. 10–10*c*)" the mandibles and maxillæ are described and figured. In a footnote, however, Dr. Hansen says that, judging by the length in comparison with the depth of the fourth side-plate, and by the form of the widened second [first free] joint of the fifth peræopod in Phipps' figure, as well as by the size of the animal, Phipps' species must be the same as *Stegocephalus kessleri*, Stuxberg. His own specimens ought therefore, he says, to have been named *Stegocephalus inflatus*, Krøyer. Dr. Hansen also states that *Stegocephalus kessleri*, Stuxberg, is pretty certainly the same as *Stegocephalus ampulla*, forma altera, Goës.

Of "*Acanthostepheia Malmgrenii* (Goës) (Tab. xxi, Fig. 11, 11*a*.)," the maxillæ are described and figured.

"*? Oediceros microps* G. O. Sars (Tab. xxi, Fig. 12.)," is thought to be possibly an intermediate form between *Oediceros microps*, Sars, and *Oediceros macrocheir*, Sars.

Boeck's *Acanthonotozoma* is altered into *Acanthonotosoma* for the three species, *cristatum* (Owen), *serratum* (O. Fabr.), and *inflatum* (Kroyer). Of the last species Hansen's largest specimen was "18,5 ^{mm}" in length, and the postero-lateral angles of the first two pleon-segments were acute, making it doubtful whether Boeck's *Acanthonotozoma inflatum*, 6,5 ^{mm} long, and with these angles rounded, is really the same as Krøyer's species.

To *Acanthozone cuspidata* (Lepechin) the synonyms assigned are "*Onisus cuspidatus* Lepechin," "*Amphithoe Hystrix* Krøyer," "*Acanthozone cuspidata* Boeck," and the species is said to be easily distinguishable from all other Amphipods, without notice of the doubt thrown upon this point by E. J. Miers. See Note on Lepechin, 1780.

Of "*Gammarus Locusta* (Lin.). (Tab. xxii, Fig. 2–2*b*.)" the maxillæ and maxillipeds are figured, with a view more particularly to show the basal joints.

Melita dentata (Kr.) is recorded, and "*Gammarus dentatus* forma altera Goës" is described as a new species "*Melita Goësii* n. s. (Tab. xxi, Fig. 13)." It is a little singular, if the two forms are really distinct, that a single specimen of each should have been obtained at the same spot, the two specimens also closely agreeing in size; but the differences are said to be numerous.

"*Melphidippa spinosa* (Goës)" is identified with "*Gammarus spinosus* Goës," but doubtfully with Boeck's *Melphidippa spinosa*.

A female *Podocerus* is named "(?) *Podocerus brevicornis* G. O. Sars." Nine specimens of "*Egina spinosissima* Stimpson" were obtained, and Dr. Hansen observes that the species from the "Vega" expedition named *Egina echinata* is obviously this species.

Of "*Caprella spinosissima* Norman (Tab. xxii, Fig. 4, 4*a*.)" the maxillæ are described and figured, and the statement made that on the second pair and three hindmost pairs of legs there is a short but well chitinized and movable first joint. This species should rather be called *Caprella horrida*, Sars. See p. 571, in Note on Sars, 1885.

The other species here recorded are named "*Parathemisto abyssorum* A. Boeck;" "*Socarnes Vahlii* (Kr.);" "*Anonyx lagena* Kr.;" "*Anonyx gulosus* Kr.;" "*Orchomene pectinatus* G. O. Sars;" "*Harpinia plumosa* (Krøyer);" "*Halicreion latipes* G. O. Sars;" "*Aceros*

phyllonyx (M. Sars);" "*Atylus Smittii* (Goës);" "*Halirages fulvocinctus* (M. Sars);" "*Tritropis Hellerí* Boeck;" "*Tritropis fragilis* (Goës);" "*Tritropis inflata* G. O. Sars;" "*Gammaracanthus loricatus* (Sab.);" "*Ampelisca Eschrichtii* Kr.;" "*Ampelisca macrocephala* Lilljeb.;" "*Haploops tubicola* Lilljeb.;" "*Haploops lævis* Hoek;" "*Byblis Gaimardii* (Kr.);" "*Autonoë longipes* (Lilljeb.)" "*Uneiola irrorata* Say."

The "Résumé," pp. 508–511, mentions three other species, "*Orchomene minutus* (Kr.);" "*Aristias tumidus* (Kr., non Boeck);" "*Amphithopsis glacialis* n. sp.," to be described in a work on the Malacostraca of West Greenland. In discussing the second maxillæ of the Malacostraca, Dr. Hansen says, "dans les Amphipodes, les éléments de la mâchoire sont un peu réduits: le quatrième article fait défaut, ou bien se confond avec le troisième, qui se prolonge en un grand lobe." Of the first maxillæ he says, "le premier article, dans les types que nous venons de nommer (excepté dans les *Caprella*), est muni d'un puissant lobe, et la partie basale de ce lobe se continue, dans les *Boreophausia*, *Mysis*, et *Diastylis*, en un prolongement lamelliforme dirigé en dehors, sur la face inférieure de la mâchoire. Le second article est toujours petit et sans lobe; le troisième est grand et se prolonge en un grand lobe. La mâchoire n'a pas plus d'articles dans les Isopodes et les *Mysis*: dans les *Diastylis* et les *Boreophausia*, on trouve un quatrième article sous forme d'une palpe dirigée en avant ou (dans les *Diastylis*) en arrière; les Amphipodes présentent un quatrième et cinquième article comme une palpe biarticulée, dirigée en avant."

M. Th. Holm, who accompanied the expedition, gives at pp. 495, 496 interesting notes on the colours of the living Amphipods. *Socarnes bidenticulatus* "blanchâtres avec une coloration rouge foncée sur le milieu du dos et descendant un peu des deux côtés du corps." *Stegocephalus inflatus* "était le plus souvent d'un brun de bronze reluisant, avec des taches blanches sur les anneaux du corps et sur les épimères." *Acanthonotosoma inflatum* "attirait l'attention surtout par sa belle couleur cramoisie, avec ou sans des ceintures transversales plus claires. *Gammarus locusta* "était presque blanc, aux yeux noirs." *Acanthozone cuspidata* "se distingue . . . . par . . . . sa couleur bigarrée, blanchâtre avec des ceintures transversales d'un brun foncé, et par ses grands yeux d'un rouge clair." *Acanthonotosoma serratum* is "blanc avec des bandes transversales d'un rouge jaunâtre, l'*Halirages fulvocinctus*, d'un blanc de neige avec une large ceinture transversale d'un rouge vif au milieu du thorax." "*Acanthostepheia Malmgreni*, gris." "*Eusirus Holmii*, d'un rose pâle, presque diaphane." Their abundance in the region explored (about lat. 71° N., long. 62° E.) may be estimated from the fact which he mentions that, "quand on descendait, jusqu'au fond, des chiens morts et qu'on les remontait au bout de vingt-quatre heures, non seulement ces derniers, mais encore le grand sac de toile à voiles où ils étaient placés, étaient garnis de *Socarnes bidenticulatus* et de deux ou trois espèces d'*Onisimus* si bien qu'on ne pouvait, littéralement parlant, distinguer ni chien, ni sac."

[A few papers which have not been described in their proper places will be found recorded in the Appendix.]

DESCRIPTION OF GENERA AND SPECIES.

Class CRUSTACEA.

Subclass MALACOSTRACA.

Thoracipoda, H. Woodward.

Order EDRIOPHTHALMA, Leach, 1815.

Tetradécapodes, de Blainville, 1816.
Arthrostraca, Burmeister, 1837.
Choristopoda, Dana, 1846.

Suborder **AMPHIPODA**, Latreille, 1816.[1]

Tribe 1. AMPHIPODA GAMMARINA.

Head not coalesced with the first segment of the peræon.

Peræon of seven distinct segments, very rarely reduced to six (*Dulichia*) by the coalescence of the last two.

Pleon of six distinct segments bearing appendages, and the telson; rarely with two (*Atylus*), or with three (*Goplana*), of the segments coalesced, or with only five distinct segments and five pairs of appendages (Dulichidæ); the telson (probably) never absent.[2]

Eyes generally two, sometimes four (*Ampelisca*) or none (*Byblis abyssi*, Sars, &c.), seldom very large or projecting much above the surface of the head; generally with many component ocelli, sometimes simple (Ampeliscidæ).

Antennæ, two pairs; the proportions not constant; the upper often having a secondary flagellum, well-developed or rudimentary, but very rarely (*Gammarus sarmatus*, Dybowsky) of great length.

Maxillipeds generally with two pairs of plates, neither pair coalesced, and a four-jointed palp; the palp rarely with only three joints (*Normania*), or only two (*Lafystius*).

[1] For definitions, see Glossary, and Notes on Latreille, 1816 (p. 95), 1817 (p. 95), 1829 (p. 137); Burmeister, 1837 (p. 170); Milne-Edwards, 1840 (p. 184); Dana, 1852 (p. 256); Claus, 1880 (p. 508), 1884 (p. 553); Gerstaecker, 1886 (p. 579).

[2] But see, in Bibliography, Notes on *Icridium*, Grube, 1864 (p. 348), *Ichthyomyzocus*, Hesse, 1873 (p. 417, and in Appendix), the Orchestidæ, Zaddach, 1878 (p. 485).

The side-plates of the peræon varying greatly in size, but those of the sixth and seventh segments never very large.

Pleopods generally having the inner angle of the peduncle armed with two or more small coupling spines, and the first joint of the inner ramus furnished with some apically-cleft spine-like setæ.

Family Orchestidæ, Leach, 1814.

The following is the definition of the family by Boeck, 1872 :—

"*Upper Lip* strong, rounded at the apex.

"*Mandibles* very strong, curved, much dentate at the apex, carrying a row of plumose spines; inner appendage strongly dentate; molar tubercle very prominent; palp wanting.

"*First Maxillæ* armed with strong pectinate teeth; inner plate elongate, narrow, with two plumose setæ at the apex; palp small or wanting.

"*Second Maxillæ* with broad plates.

"*Maxillipeds* with the outer plate small, broad, ovate, having on the margin slender spines or setæ; the inner plate elongate, broad, apically truncate, armed with three strong teeth; palp strong and broad, the last joint sometimes wanting.

"*Body* compressed; back rounded; side plates well developed.

"*Upper Antennæ* more or less shorter than the lower, without accessory flagellum.

"*Lower Antennæ* with the two anterior joints very short but pretty broad.

"*Uropods* short and strong; the first and second biramous, the last pair one-branched.

"*Telson* short and thick."

Genus *Orchestia*, Leach, 1813.

Leach, in 1813, in the first division of his family Gammarini, defines *Talitrus* as having "Anterior pair of feet larger than the second pair; no hands," and *Orchestia* as having "Two anterior pair furnished with a movable thumb, which is capable of being bent on the edge of the hand; second pair largest, having a compressed hand." For further definitions, see Notes on Leach, 1815 (p. 90), Friedrich Müller, 1848 (p. 226), J. F. Brandt, 1851 (p. 244), Dana, 1852 (p. 257). Boeck's definition, 1872, includes "Maxillæ 1mi paris palpo destitutæ," but some species of *Orchestia*, if not all, have a rudimentary palp on the first maxillæ; it also includes "pedes maxillares palpis perbrevibus latis; articulo palpi 2do sursum dilatato, 4to absenti," in which statement it would probably be more accurate to substitute *rudimentari* or *tuberculiformi* in the place of the word *absenti*.

Orchestia selkirki, n. sp. (Pls. I., II.).

The Head is somewhat longer than the first segment of the pleon; rostrum rudimentary. Peræon moderately dilated; beyond its fourth segment the body tapers rather rapidly to the telson. Segments not greatly differing in length; first of the pleon the longest. The first three pleon-segments are postero-laterally squared, the angles very slightly outdrawn, and the margins above them serrate upwards.

Eyes roundish to oval, conspicuously black in the spirit specimens; distance between the two equal to the smaller diameter of one.

Upper Antennæ.—Three joints of peduncle small, successively decreasing much in thickness. Flagellum shorter than peduncle. In the male specimen figured the flagellum on one side had nine joints, that on the other only eight. In the female the flagellum had only six joints.

Lower Antennæ.—Last two joints of peduncle long and stout, the last thinner than the preceding. The tapering flagellum consists of about twenty-eight joints, all except the last one or two distally widened.

Upper Lip with rounded distal border minutely furred, the hairs on either side inclining towards the centre of the margin.

Mandibles.—The cutting edge of each mandible ends in a strong double tooth, preceded in the left-hand mandible by four, in the right-hand by three or four smaller teeth; the secondary plate, on the left mandible, resembles the cutting edge, except that it ends in a single tooth and is less powerful; on the right mandible it has a bidentate termination, the ridges of the double tooth being minutely denticulate, and preceded by three inconspicuous teeth. The spine-row consists of four sinuous plumose bristles, two stout and two thinner ones. The prominent molar tubercle has the oval face set with numerous rows of denticles. There is a long plumose bristle at one corner, and a sort of hairy tuft at the opposite corner. I can find no trace of any rudimentary articulated palp, such as is figured by Savigny for *Orchestia montagui* and Guérin for "*Orchestia gammarella*." There is a prominent lobe rising just above the base of the molar tubercle, obviously connected with the articulation and movement of the mandible, which has perhaps in other species suggested the presence of a palp.

Lower Lip.—The principal lobes very slightly dehiscent; the mandibular processes[1] broadly rounded, not projecting far.

First Maxillæ.—The inner plate narrow, tipped with two plumose bristles, its inner edge nearly straight, the other edge sinuous; the broad outer plate is distally edged with nine denticulate teeth in a double row. Just below the broadest part of the plate, within the outer rim, springs a minute palp consisting of one slender joint, at the tip of which a little pimple may be the rudiment of a second joint or of a spine.

[1] See Note on Schiødte, 1875 (p. 449).

Second Maxillæ.—Outer plate longer and slightly broader than the inner one, distally fringed with a mass of slender curved spines, the outer ones the longer; the inner plate has the distal fringe of short spines passing in an even curve some way down the inner margin to a plumose bristle much longer and stouter than the spines; below this there are some hairs, as there are also on the other margins of both plates.

Maxillipeds.—Inner plates rather long, with plumose bristles passing up the inner margin, within the distal, and down part of the outer margin; three short, strong teeth on the distal margin, and one having its insertion just below the inner angle of the plate. Outer plates short, not reaching beyond first joint of palp, short spines within distal margin and upper part of inner margin; other spines, of various sizes, but none large, singly or in groups, on the outer side of this and the preceding joint. First joint of palp with outer border much longer than the inner; second joint distally lobed on the inner side; inner margin of this and the next joint fringed with short spines; all three joints with small rows of spines on the outer sides; the fourth joint rudimentary, a tubercle, tipped with spines.

In the so-called *triturating organ* at the anterior end of the stomach a row of twenty-eight spines is found, becoming longer and thinner at both ends of the row.

First Gnathopods.—The side-plate almost concealed by that of the second segment; spines on its lower border, and on the inner side, and on an inner lobe where the first free joint articulates. In the male, first joint broad except at its origin; fourth joint postero-distally lobed, much longer than fifth; hand with a conspicuous postero-distal lobe; finger short, closing over the slightly concave palm so as to reach the inside of this lobe; distributed over all the joints on margins and surfaces are spines with subterminal accessory threads; a row of minute straight hairs on the palm; and a stronger spine where the tip of the finger closes down; some fine spines on the finger at the origin of the nail, where also the inner margin of the finger slightly projects. In the female, the first joint almost parallel-sided, the fourth joint a long narrow triangle, with hinder (especially the distal) spines prominent; hand widening a little distally, the finger projecting beyond the slightly convex palm.

Second Gnathopods.—The side-plate fringed below with spinules; the hinder margin in this and the next two pairs of side-plates having a projecting process for purposes of articulation; branchial vesicle much broader than long, upper border very sinuous; in the male first joint shorter than hand, broadest near its origin, lower edge slightly lobed; second joint antero-distally lobed on the outside and medio-distally on the inside; third joint squared; wrist a small cup, almost lost in the outswelling of the hand beyond it; the immensely powerful hand broadest near its origin; palm sinuous, bordered with spines of various sizes, and forming a groove on the inner side into which the point of the finger closes down; the finger itself strong, inner margin fringed with spinules, and forming a double concavity, that near the tip leaving an open space between finger

and hand, even when the two are tightly closed together. The spines on this limb, except on the palm of the hand, are few and small. In the female, the first joint is more narrowed distally than in the male, the second joint is lobed on the front margin; the third and fourth joints much resemble in form the corresponding joints in the first gnathopod of the male, but the hinder margin of the fourth joint is here thin and without spines; the hand, narrow at its origin, swells out to a postero-distal lobe beyond the palm, without spines on the thin, curved hinder, or nearly straight front, margin; a row of spines along each side, a group close to the hinge of the feeble finger, spinules along the palm, over which the finger closes tightly; fur on the thin lobe which projects beyond the palm. Wrist rather longer than hand and shorter than first joint.

First Peræopods longer than second; spines on both edges of all joints but the second; third joint longer than any but the first, fourth not much, sometimes not at all, longer than fifth, both spinous; finger short, with curved nail; branchial vesicle with a large basal, and a narrow terminal, lobe.

Second Peræopods very similar to first, but dimensions smaller in regard to length, the side-plate somewhat broader, the fourth and fifth joints equal in length; the finger in both sexes differing from that of the first peræopod in having its hinder margin sinuous. There is a corresponding irregularity of outline in this margin in the second peræopods of *Talitrus locusta*, of *Orchestia gammarellus*, and in an exaggerated form in *Talorchestia tumida*, G. M. Thomson; but not, so far as I know, in *Hyale* or *Hyalella*.

Third Peræopods very much shorter than the two following, though more than half the length of the fifth peræopod; front lobe of the side-plate nearly as deep as that of the fourth segment; branchial vesicle with a small basal, and a large oval terminal, lobe; first joint oval, with spines on front, and spinules on hinder, margin; third, fourth, and fifth joints spined on both edges, not differing greatly in length, decreasing successively in breadth; finger small, with curved nail.

Fourth Peræopods.—Hinder lobe of side-plate larger than the front one; branchial vesicle with a short narrow basal and a long narrow terminal lobe, the latter curving first backwards and then downwards; first joint a long oval, third and fourth joints subequal, fifth rather longer and considerably thinner; finger slender, longer than that in the third peræopods.

Fifth Peræopods.—Side-plate not bilobed, deeper behind than in front; first joint broader than that of the fourth peræopods, which in most respects these closely resemble, but with the third, fourth, and fifth joints longer.

Pleopods.—Peduncles long and slender, longer than the rami, wide apart at the base, curving in towards one another, armed with a few small spines; the joints of the rami numbering from seven to eleven; the setæ very finely plumose: I cannot perceive any cleft spines on the long first joint of the inner ramus, such as are commonly found in other families, nor even a single short one, such as occurs in *Talitrus locusta*; the

coupling-spines at the distal end on the inner side of each peduncle are two in number, and something like those of *Talitrus locusta*; the shafts are a little bent and exceedingly short, while the heads by comparison are very broad, showing a retroverted tooth on either side.

Uropods.—The first have the peduncle longer than the subequal rami; both peduncle and rami spined on the edges, a group of spines at the tip of each ramus, one of predominant size. In one of the specimens examined the rami on one side were much shorter than those on the other. The second uropods similar to the first in armature, but shorter, the peduncle subequal in length to the rami. The third uropods with short peduncle and short ramus spined on the outer edges; the peduncle tapering distally, broad below, from above looking as if cylindrically folded over.

Telson.—Broad at origin, tapering to two small distal lobes, these and the lateral margins set with spines; a median suture runs from the base some way towards the meeting point of the distal lobes. The sixth segment of the pleon scarcely visible from above folds beneath the whole length of the telson.

Length about half an inch, sometimes reaching seven-tenths, without counting the antennæ.

Locality.—Fifty-two specimens were taken on the shore at Juan Fernandez. The species is named after Alexander Selkirk, whose romantic story is connected with that island.

Remarks.—*Orchestia serrulata*, Dana, from New Zealand, seems to be its nearest ally, but the two species are separated by numerous differences in detail, among which may be noticed the first gnathopods in the female, the palm of the second gnathopods in the male, the relative lengths of the peræopods.

Family Lysianassidæ, G. O. Sars, 1882.

For the original definition of the subfamily Lysianassinæ, Dana, see Note on Dana, 1849 (p. 229).[1] The subfamily Lysianassinæ, Boeck, 1870, is changed by Sars into the family Lysianassidæ, without further definition. Boeck's definition of it in 1872 is as follows:—

"*Upper Lip* and *Epistome* more or less prominent.

"*Mandibles* elongate; cutting edge broad, not dentate or only furnished with very few teeth on the inner margin; an inner plate on the left mandible; molar tubercle small, more or less prominent; spine-row furnished with few blunt and often very small teeth; palp elongate, triarticulate.

"*Lower Lip* elongate; inner plates little, near the apex [? generally absent].

"*First Maxillæ* with two-jointed palp; rarely without palp.

"*Second Maxillæ* more or less elongate.

[1] For Schiodte's *Trochalognatha*, see Note on Schiodte, 1875 (p. 449).

" *Maxillipeds* robust; plates more or less elongate; last joint of the palp unguiform, rarely tubercle-shaped or obsolete.

" *Body* deep; back thick, generally rounded; very rarely carinate.

" *Side-plates* deep, narrow.

" *Upper Antennæ* with the peduncle very short, thick; the second and third joints very small; flagellum more or less elongate; first joint more or less elongate, always longer than the following joints, and on the inner side furnished with two brush-like rows of setæ.

" *Lower Antennæ* with the flagellum elongate in the male, shorter in the female.

" *First Gnathopods* more or less elongate, generally with a small subchelate hand; rarely with the hand large or not subchelate.

" *Second Gnathopods* elongate, filiform, with a small hand; rarely without a nail.

" *Peræopods* of the last three pairs successively longer; the first joint posteriorly laminar, dilated."

In the new genus *Sophrosyne* the maxillipeds are rather to be described as slender than robust; the epithet "narrow" is by no means universally applicable to the side-plates in this family, the fourth pair generally, and sometimes others, being of considerable breadth; occasionally the fourth peræopods are longer than the fifth. *Amaryllis*, Haswell, is an aberrant genus in regard to the upper antennæ.

Genus *Anonyx*, Kroyer, 1838.

For the original definition see Note on Kroyer, 1838 (p. 178). Boeck in 1872 defines the genus as follows:—

" *Epistome* helmet-shaped.

" *Mandibles* with the palp fixed nearer the apex than the very prominent molar tubercle.

" *First Maxillæ* with the inner plate ovate, small, furnished with two plumose setæ on the apex.

" *Second Maxillæ* with the plates broad and short; the inner plate much shorter than the outer.

" *Maxillipeds* with the outer plate small, not reaching the distal end of the second joint of the palp, nodulous on the inner margin; palp robust; last joint unguiform.

" *First Gnathopods* more or less elongate, robust; hand quadrangular, obliquely truncate at the apex.

" *Telson* longer than the peduncle of the last uropods.

" *Third Uropods* with the branches longer than the peduncles, setose.

" *Body* not deep. Side-plates not deep; fourth not much excavate, not deeper than broad. Postero-lateral angle of the third pleon-segment produced, upturned, acute."

Anonyx ampulloides, Spence Bate (Stimpson, MS.) (Pl. III.).

1862. *Anonyx ampulloides*, Spence Bate, Brit. Mus. Catal. Amph. Crust., p. 78, pl. xii. fig. 8.

Rostrum rudimentary; lateral lobes of the head rounded; the head as long as the first peræon-segment; first peræon-segment longer than the second. Peræon dorsally rounded. First four segments of pleon dorsally acute, the third segment deeply excavate above the much upturned, slightly produced postero-lateral angles, the lower margin being as it were bent up so as to form a piece of the hinder margin. The fourth segment with a dorsal depression, the sixth laterally ridged above on each side of the telson.

Eyes reniform, occupying a great part of the surface of the head, and nearly meeting at the top of it, therefore very large. The component ocelli short and small, numbering certainly more than three hundred.

Of the somewhat projecting connate epistome and upper lip a lateral view is given in the Plate.

Upper Antennæ.—First joint large and tumid, second and third very small; flagellum incomplete, eleven joints remaining, of which the first, bearing a brush, equals in length some six or seven together of those which follow; the secondary flagellum, of seven or eight joints, has the first of equal length with the first of the primary and partially sheathed in a fold of that joint; its terminal joints are narrow.

Lower Antennæ.—Gland-cone seemingly very obtuse; third joint narrow proximally, widened distally, with spines on the upper distal margin; fourth joint longer and much stouter than the fifth, furred on the upper margin, carrying a row of feathered cilia on the lower, and on its prominent apex a group of long setæ; the fifth joint furred on its upper margin. Of the flagellum there remained only ten joints, the first of these being equal in length to the two following combined.

Mandibles.—The cutting edge smoothly convex, with a denticle at the top; the lower rim in front is cut into four spine-shaped teeth, the margin of the mandible behind these being straight and smooth; the secondary plate on the left mandible high up on the primary, ligulate or spiniform, very small; the spine-row consists of four spines followed by nine branching spiniform setæ; the molar tubercle long, produced backwards, strongly furred with cilia, but not dentate; the palp set far forward, level with the front of the molar tubercle, the second joint considerably longer than the third, on its outer side a long row of spines or setæ curving round the upper half of inner margin to the outer apex, three on the upper part of the outer margin; third joint widening for rather more than a quarter of its length, and from that point carrying a row of eighteen spines along the inner margin to the apex; this joint has also five setæ in three sets on the inner side near the outer margin.

Lower Lip.—Strongly ciliated on the inner and apical borders; the distal portion of

the front lobes narrow, strongly dehiscent, suddenly widening and therefore coming nearer together about half-way down the long cleft that separates them.

First Maxillæ.—Inner plate small, oval, with two plumose setæ on the apex, the outer the larger; outer plate with the very oblique apical margin densely ciliated, especially on the lower part; its eleven spines strikingly different from one another in their dentation; of the two which stand apart from the rest at the lower end one is slender with many small teeth, the other stout with three large ones; of those set round the upper end some are peculiar by their distal widenings. The large second joint of the palp widens distally, the distal border being cut into six teeth, the tip of each except the minute inner one having a small spine-tooth inserted in it; between the outermost marginal tooth and the next is an additional small prominence, and again between the second and third teeth is a small cilium.

Second Maxillæ.—The plates are similar to one another in general shape, the convex margins meeting in a pointed apex, the outer plate considerably longer than the inner. From the apex down half the inner margin the inner plate has plumose setæ ending in one larger than the rest, and along the same part it has spines shorter than the setæ, the spines being armed midway with straight spine-like cilia. The spines which in like manner arm the outer plate have these cilia, seemingly limited to four in number, except on the lowest spines, which become more seta-like.

Maxillipeds.—Inner plates small, not reaching nearly so far as the distal end of the first joint of the palp, apical margin with three tiny teeth inserted on little prominences, the plumose setæ of the inner margin very long, passing over to quite small ones at the outer angle of the apex; the outer plates large and long, still not reaching the apex of the second joint of the palp, the inner border showing some six and twenty minute prominences as if for teeth, but with no appearance of teeth upon or within them, the same description applying to two on the rounded apical border; the second joint of the palp more slender and somewhat longer than the first; the third joint widening from a narrow neck, with setæ on both borders, distally furred; finger long, with adpressed cilia on the surface, a dorsal cilium nearer to the acute point than to the base.

First Gnathopods.—Side-plates a little excavate in front, much wider below than above, with the usual little cilium-bearing indent at the lower end of the hinder margin. First joint broad, about as long as the third, fourth, and fifth together, with setæ on both margins; third joint with no free front margin, its hinder margin furred, apically carrying geniculate spines and setæ; wrist equal in length to the hand, dilated below, furred on the free part of the hinder margin, with spines round the distal part both before and behind; hand less wide than the wrist, widest at the base, but preserving most of its width all along to the by no means oblique palm, which is bordered with minute cilia, and defined by two spines, between which the finger closes down, the nail overlapping the palm. There are various spines and setæ, singly, in rows, and in groups,

on the two borders and the sides of the hand. The finger has a denticle on the inner margin.

Second Gnathopods.—Side-plates widened below, the front, hind, and lower margins almost straight; the first joint fringed with setæ behind, parallel-sided, distally bending backwards; second joint as long as the wrist, third with the anterior margin short, the posterior much rounded, furred, with several long setæ near the rounded apex; the wrist a good deal longer than the hand, the front margin distally furred, and carrying long setæ near and at the apex; the hinder margin furred nearer to the third joint, and carrying eleven groups of setæ increasing in length successively to the apex; the hand much longer than broad, much furred, armed with the usual spines, narrowing a little distally, the finger comparatively long, occupying almost all the apical margin, its terminal portion not much crooked.

First Peræopods.—Side-plates similar to those of the preceding segment, but larger. First joint strong, carrying setæ on the hind margin; third joint large, nearly as long as the first joint, having groups of setæ, short mixed with long, on the hinder border; fourth joint somewhat shorter, much narrower, armed with spines and setæ, narrowing distally; fifth joint as long as fourth, slender, a little curved, on the hind margin carrying short spines and long ones, and close to the hinge of the finger a minute one with a hook at the tip, bent toward the comparatively short finger.

Second Peræopods.—Side-plates with front and lower margins straight, hinder lunately excavate; a small smooth ovigerous plate. The rest of the limb missing.

Third Peræopods.—First joint much contracted below, at the upper part almost as broad as the side-plate, though not appearing so in the full figure on the Plate, because the side-plate is seen full, while the first joint is not quite full-face to the spectator; its hind margin is nearly straight, shallowly serrated, slightly concave below, while the front margin is convex and spined all round; third joint dilated, a little produced behind, with spines on hinder rim; both second and third joints have spines and setæ on the front rim; fourth joint as long as the two preceding united, broader above than below, the front margin with five pairs of short spines, each of the upper four pairs with a long seta between the two spines, the fifth pair without a seta, a sixth apical pair with a long spine intervening; the fifth joint thinner than the fourth, equal in length, straight, with five pairs of spines on the front margin; finger rather short.

Fourth Peræopods.—First joint oval, contracted below, closely spined on more than half the front margin which is smooth above, the lower margin behind forming a narrow lobe instead of a broad one as in the third peræopods; setæ and spines on the front rim of the short second joint; the remaining joints similar to those of the preceding pair, but each longer than the corresponding one in that pair; the finger missing.

Fifth Peræopods.—First joint of uniform breadth all along, front margin slightly concave, spines increasing in size towards the lower end, and the serrations of the hind margin

doing the same; the third joint not dilated, armed in front with four or five pairs of spines, behind with one at the apex, and another a little way from the apex. The rest of the limb missing on one side, on the other side represented by a somewhat tapering stump as long as the third joint and destitute of armature.

Pleopods.—In the third pair the two blunt-headed coupling spines on the peduncle were observed to have two or more retroverted teeth, and the rami to consist of twenty-one joints, the large first joint of the outer ramus having a fringe of thirteen plumose setæ.

Uropods.—Peduncles of the first pair considerably longer than the rami, carrying numerous spines on both the upper edges, those on the outer edge being smaller than those on the inner; the outer ramus slightly longer than the inner; on its upper edge the outer has eight spines, the three approaching the tip being much stouter than the earlier five; on the inner edge is a row of three very fine spines; the inner ramus also has spines on both edges, and proximally has a little pocket on the under side into which the projecting edge of the other ramus can insert itself. Peduncles of the second pair equal in length to the rami, spined on both the upper edges, the outer edge having twenty-seven nearly uniform spines, the smallest not far from the base, the largest close to the apex, the intermediate not regularly graduated; the outer ramus is bordered with nine spines increasing gradually towards the apex, but stopping far short of it; the last is inserted in a sort of little pocket, as is the case with the last three on the outer ramus of the first uropods. The inner branch is subequal in length to the outer; it has six or seven small spines on the border, followed by a long one inserted in the curved margin which abruptly terminates the broadest part of the branch, the remainder forming a finger-like termination without spines and apparently without any cilium in the angle. The lower border of this branch is much bent. The peduncles of the third pair are shorter than the rami; the rami are subequal, lanceolate, with spines on both borders. That which I take to be the outer ramus is represented in the lateral view of the pleon (fig. *Pl. L.*), without its companion; it terminates in a nail; the other ramus has on its margin a row of setæ. In the other member of the pair, as the figure shows, the ramus with a nail seemed to be the inner one.

Telson.—Its upper lateral margins much overlapped by the folds of the sixth pleon-segment; the sides straight, only in a very slight degree convergent; cleft for three-quarters of its length, the plates becoming gradually dehiscent by the curving away of the inner sides towards the distal end; each outer apical corner a little produced, with a small spine between the angle and the adjoining inner curve.

Length from the front of the head to the back of the second pleon-segment, in the bent position represented, about nine-twentieths of an inch.

Locality.—Station 236, off Japan, June 5, 1875; lat. 34° 58′ N., long. 139° 29′ E.; depth, 775 fathoms; bottom, green mud; bottom temperature, 37°·6. One specimen, female. Trawled.

Remarks.—This species bears a close resemblance to that which Krøyer described as *Anonyx lagena*, *Anonyx appendiculosa* and *Anonyx ampulla*, and which Phipps had already described as *Cancer nugax*. Krøyer gave the name *ampulla* under the erroneous impression that his species was identical with Phipps' *Cancer ampulla*, and described it with exact detail in his Naturhistorisk Tidsskrift, 2. R. i. 578–599. Though the name *ampulla* is untenable for Krøyer's species, attention is well called to his admirable description of it by the name given to the present kindred species. *Anonyx ampulloides* differs from *Anonyx nugax* in that the eyes are not lageniform, flask-shaped; the apical border of the palp in the first maxillæ is peculiarly divided; the inner ramus of the second uropods is not stiliform, but bent on one side and abruptly narrowed on the other; and in other small details.

In the British Museum Catalogue of Amphipodous Crustacea, it is represented on pl. xii. fig. 8, and the following account is given :—

"Anonyx ampulloides, *Stimpson, MS.*

"In general aspect this species resembles *Anonyx lagena;* but close examination shows the following distinctions :—

"The inferior antennæ are much longer than the superior. The first pair of gnathopoda have the palm fringed with fine hairs, but not a comb-like margin. The second pair of gnathopoda have the carpus slight, and much longer than the propodos; the dactylos quite rudimentary. Telson deeply divided, becoming almost a double appendage.

"Length half an inch.

"I am indebted for this specimen to the kindness of the author, who brought it from Japan."

As I had myself chosen the name *ampulloides* for this Japanese species, before observing its resemblance to the figures, in Mr. Spence Bate's Catalogue, of the species so called by Stimpson, the identification seems fairly to be depended upon.

Anonyx cicadoides, n. sp. (Pls. IV., V.).

Rostral Margin forming an obtuse but definite angle; the lobe of the head between the upper and lower antennæ rounded above and straight below. The three hinder peræon-segments longer than those which precede, but much shorter than the three segments of the pleon which follow them; the fourth segment of the pleon with a dorsal depression near its origin; the fifth and sixth segments very small, the sixth with a dorsal ridge or fold along either side of the back; the infero-posterior angle of the third pleon-segment much produced upwards.

Eyes not made out; in one of the specimens appearances suggest that they have been present, of a long oval shape, near the front of the head.

Upper Antennæ.—First joint stout, cylindrical, longer than the combined length of the two following joints, which are very short, and the long first joint of the flagellum. Flagellum tapering, in the female consisting of twenty joints, of which the first is longer than the four following united; besides the usual brush it has two large, slightly curved, distal spines; the second joint has two similar spines, and the fourth joint a similar but much smaller spine; the secondary flagellum is of nine joints, the first very long, the last minute. In the male the primary flagellum has calceoli on most of the joints.

Lower Antennæ.—First joint broad; the gland-cone with a conspicuous orifice, not spiniform; third joint with lower and distal margins lobed, fourth and fifth joints furred above, and with various groups of setæ below, one group in the fourth joint being on a little prominence near the base; the fifth joint somewhat longer than the fourth; flagellum in the female of about thirty joints, of which the first is much longer than the second. In the male the flagellum has about fifty joints, and is furnished with calceoli.

Mandibles with the palp far forward, just over the narrow interval between the molar tubercle and the spine-row; cutting edge smoothly convex, but with a small projection at the top, and an emargination in the return of the curve below. The secondary plate in the left mandible is short and narrowly ligulate. The spine-row consists of three curved spines. The molar tubercle is large and prominent, the crown of it minutely dentate and ciliate, pointing away from the cutting edge, the articular condyle pointing towards that edge. The first joint of the palp very short, the second very long, with a row of pectinate spines on the distal part of its margin. The third joint, about half the length of the first and second united, has two long spines near the outer angle of its base, and along almost the whole of its inner margin a row of pectinate spines, of which those at a little distance from the apex are the shortest, those at and close to the apex the longest.

Lower Lip deeply cleft, much ciliated round the margins of the forward lobes, which are rather abruptly contracted near their extremities, thus making the inner margins very sinuous; the ovate mandibular processes almost smooth.

First Maxillæ.—Inner plate small, oval, ciliated along the inner edge, and with two unequal plumose bristles at the apex; outer plate much ciliated on the surface and distal part of inner margin; at its apex five long spines, this row continued inwards on the outer side by two more, while a row of four, rather smaller, descend the sinuous inner margin; all are dentate on their edges some way short of the curved tip, the end one on the outer side having but one tooth, the end one on the inner side having several denticles. The two-jointed palp overtops the spines of the inner plate. The second joint is very much expanded distally, the curve of the outer margin ending in two microscopic teeth at the point of greatest expansion, the margin then running obliquely to meet the great distal curve set with nine teeth and a spine, the spine being outermost, with a short, spiny seta not far off.

Second Maxillæ.—Inner plate much shorter and narrower than outer, fringed from the apex half-way down the inner margin with spines decreasing in size as they recede from the apex, and with plumose setæ the longest of which are beyond the shortest of the spines; outer plate fringed with rows of long and short spines from the apex far down the inner margin, the longer spines curved at the tips. Both plates have their inner edges comparatively straight, the outer much curved, their surfaces and inner edges much ciliated; the outer plate has also a row of small spines from the apex down a small portion of the outer margin.

Maxillipeds narrow. The inner plates not reaching the distal end of the first joint of the palp, widening distally, apical border much excavated and forming a projection at the inner corner, which is set with three broad scarcely prominent teeth, just below which on the outer side of the inner margin are two small spines; long plumose setæ occupy the inner margins, passing over into shorter ones on the distal margins. The outer plates are long, reaching just to the distal end of the second joint of the palp; the lower part of the joint to which they belong is fringed with spines on the inner margin, but this margin of the plate itself is clear of spines, being indented and in each indent carrying an almost rounded tooth, which scarcely projects beyond the margin; some way within the border are small spines, rather less numerous than the teeth. It would not be unnatural to suppose that the marginal teeth had been rounded by wear; but those of the new growth, not yet exposed to wear and tear, exhibit the same shape and position. On the apical portion of the rounded outer margin there is a row of five small spines, almost adpressed to the margin. The second joint of the palp is considerably the longest; like the first and third it is at the outer apex and along the inner edge fringed with long spines or setæ, which, except for the terminal accessory thread, seem to be quite smooth. The fourth joint or finger is not of any unusual length.

First Gnathopods.—Side-plates dilated below and curving forwards, broader though less deep than those of the following segment. First joint not reaching beyond the side-plate, fringed in front and on the lower hinder angle; second joint subequal in length to third, with some fine setæ on the hinder margin; third joint produced to a sharp point below, furred behind, carrying groups of setæ on both sides near the apex; wrist furred behind, scarcely broader distally than the hand at its base, setæ in groups at both the lower angles, and a small group near the middle of the front margin; hand narrowing distally, so as at the extreme apex to be scarcely broader than the finger, furred on upper part of hinder margin, with groups of setæ along both sides of the front, and along the hinder margin and palm; that which may be considered the palm is slightly sinuous, minutely pectinate, a region shorter than the finger, determined by a short blunt spine; finger curved, with inner edge smooth, but for a tooth near the base of the nail; a spiniform cilium arises in the neighbourhood of this tooth.

Second Gnathopods.—First joint long, a little dilated below, much more lightly

fringed than the corresponding joint of the first gnathopods; second joint longer than third, fringed in front and at the lower hinder angle; third joint rather densely furred behind, clasping the next joint closely with its dilated distal part, the hinder angle of which carries numerous long setiform spines, distally pectinate; the wrist elongate, much longer than the hand, densely furred on both sides, carrying spines similar to those of the preceding joint at the front apical angle and along the distal part of the hinder margin; the hand narrow, densely furred, surrounded on both margins with pectinate spines of various lengths, many both long and short at the point where the minute finger hinges.

Second Peræopods.—Side-plates a little deeper than the preceding, as those of the third segment are, compared with those of the second. The branchial vesicles are not pleated. The marsupial plates are long and narrow, with a row of small cilia on one border, the usual long smooth setæ on the other and round the apex. First joint tolerably stout and long, with a bunch of setæ at each apical angle, and very little other furniture; second joint short, with some setæ on the hinder margin, chiefly the group at the lower hinder angle; third joint longer and very much stouter than the following, a little produced downwards in front, fringed behind with several small groups of setæ; fourth and fifth joints narrow, the latter the longer, narrowing a little distally, both bordered behind with numerous setæ, the fourth joint showing also two spines near the base, the fifth joint having twelve or thirteen in a series extending along its whole margin; the finger short and much curved.

Third Peræopods.—Side-plates rather broader below than above, and front margin slightly more convex than the hinder. First joint subequal in extent of surface to the side-plate, narrower below than above, front margin fringed with spines, hind margin serrate, the rounded distal portion overlapping the short second joint; two or three short spines and one long one on the front margin of the second joint; the same number on the hind margin of the third joint, which is short, dilated, slightly produced downwards behind, and has a row of spines and fine setæ on its front margin; fourth joint somewhat dilated, narrower and longer than third; fifth joint much narrower and rather longer than fourth, both with spines on front margin. Finger small, curved.

Fourth Peræopods.—First joint longer and more oval than that of preceding pair, rather narrower below than above; third joint much longer than in preceding pair, broader and shorter than the fourth joint, which in its turn is a little broader and shorter than the narrow fifth joint; armature of the various joints, and the finger, as in the preceding pair.

Fifth Peræopods like the fourth pair, not longer.

Uropods.—Peduncles of the first pair longer than the rami, which are narrow, curving at the tips; the outer a little longer than the inner, with a row of seven spines on the inner margin, ceasing some distance from the apex; the inner with a similar row of ten spines. Peduncles of the second pair (Pl. V. *ur.* 2.) shorter than those of the first pair, subequal in length to the longer ramus; outer ramus considerably longer than inner, a

little curved at the tip, bordered within with eleven spines; inner ramus rather like a tadpole, attached by a narrow neck to the peduncle, a broad oval portion following with a row of six spines on the inner margin, a narrow rather sinuous piece forming the termination, a minute cilium occurring where the ovate portion meets the linear. This peculiar form of ramus has been noticed in *Ichnopus*, Costa, and some other genera. Peduncles of the third pair much shorter than the lanceolate sharply pointed rami, which stretch further back than either of the other pairs; outer ramus having a nail at the tip, spines along the borders, some of them in groups on the outer margin, and plumose setæ on the inner margin; inner ramus shorter than the outer, with spines and plumose setæ on both margins, terminal nail minute.

Telson reaching further back than the peduncles of the third pair of uropods, narrowing a little towards the apex, outer edges straight, cleft for three-fourths of its length, the laminæ not dehiscent except where each curves away from the other to form the apical margin, the outer end of which is produced into a little tooth. At this tooth commences a row of three spines, diminishing in size from the tooth inwards, and followed by two minute cilia. Along the outer edges there is a row of three spines on each side, the largest a little lower down than the top of the cleft, the middle one the smallest.

Length.—The pair of specimens, male and female, to which the above description and the figures of Pl. V. refer, measured each three-quarters of an inch, exclusive of the antennæ.

Locality.—Station 149D, Royal Sound, Kerguelen Island, January 20, 1874; depth, 28 fathoms; bottom, volcanic mud. Three specimens, which were especially noticeable as being of a deep brown colour in spirits. Dredged.

Station 149, Accessible Bay, Kerguelen Island, January 9, 1874; depth, 20 fathoms; bottom, volcanic mud. Several specimens. Dredged.

Station 149H, off Cumberland Bay, Kerguelen Island, January 29, 1874; depth, 127 fathoms; bottom, volcanic mud.

Remarks.—The specimens from Stations 149 and 149H were of various sizes, one reaching as much as nine-tenths of an inch; they showed the light creamy colour so common in spirit-specimens, and this difference in colouring, combined with other variations, made me long hesitate as to whether the species of Pl. IV. was the same as that of Pl. V. There were differences in the relative proportions of the joints of the antennæ, in the shapes of the spines on the outer plate of the first maxillæ, in the proportions of the second gnathopods, in the armature of the uropods, and especially the inner ramus of the second pair of uropods, though exhibiting the sudden contraction above described, was otherwise more regularly stiliform. I have, however, convinced myself that none of these differences are of specific value. Among the light-coloured specimens the relative proportions of the antennary joints are not constant; for example, in the upper antennæ the first joint varies much in the peduncle, the primary flagellum and the secondary

flagellum; in the lower antennæ the fifth joint of the peduncle may be a little longer or a little shorter than the fourth; the spines of the first maxillæ vary much in general appearance, in this as in other species, according as they are fresh or worn with long use. To the ramus of the second uropods I should have attached more importance had I not found in a small light-coloured specimen the ramus shaped just as in the large dark-coloured specimens.

This species, in respect of the antennæ, mouth-organs, second gnathopods, peræopods, and general structure of the pleon, closely resembles *Anonyx gulosus*, Kroyer, the *Anonyx cicada* (O. Fabricius) of this Report (see pp. 46, 47). It differs from it in respect of the first gnathopods and the second uropods, in these two respects agreeing with *Ichnopus*, Costa, as defined by Boeck, but from that genus it differs in regard to the maxillipeds and the branchial vesicles, which are pointed below, but without the pectinate folds considered characteristic in *Ichnopus*. Since, by the omission of the epithet "quadrangulari," as applied to the hand of the first gnathopod, in Boeck's definition of *Anonyx*, that definition will include the present species, it seems advisable by that expedient to save the creation of a new genus. To point to its agreement with the older species, I have therefore named the new one *Anonyx cicadoides*. *Anonyx pumilus*, Lilljeborg, is retained by Boeck himself in the genus *Anonyx*, although the hand of the first gnathopods is not quadrangular.

Genus *Tryphosa*, Boeck, 1870.

For the original definition, see Note on Boeck, 1870 (p. 399). The genus is so near to *Anonyx*, Kroyer, as defined by Boeck himself, that they ought perhaps to be reunited, as suggested both by G. O. Sars and Gerstaecker.

Tryphosa antennipotens, n. sp. (Pl. VI.).

Rostrum obsolete, lateral angles of the head acutely produced; back well-rounded, most dilated at the fifth segment of the peræon; postero-lateral angles of the third pleon-segment not acute or upturned; fourth pleon-segment with a dorsal depression, distally carinate, tip-tilted, the lateral margin continuous with the curve of the lower margin of the third segment; the sixth segment ridged on each side of the telson.

Eyes indistinct, but apparently large, set back from the front margin, reniform, meeting at the top of the head.

Upper Antennæ.—First joint long and tumid, second and third joints short, narrowing distally, the distal borders sinuous; first joint of the flagellum short, equal to the four following, calceoli large and crowded, there being one on each of the fifty-two joints of the flagellum, with the exception of the first and two or three at the end. The

flagellum is long and thick, and seemingly little flexible. The secondary flagellum of four joints together is shorter than the first of the primary.

Lower Antennæ.—Gland-cone very prominent, third joint short, fourth and fifth subequal in length, with some cilia on the upper and setæ on the lower margins; flagellum of fifty-three joints, rather thinner and longer than that of the upper antennæ, the calceoli equally numerous, placed on the upper margin confronting those of the upper antennæ, but in both pairs so placed that, while the calceoli of alternate joints are seen full face, those of the other alternate joints will be seen in profile.

Epistome a little prominent.

Mandibles.—Cutting edge evenly convex, with a tooth at the top, the lower apex scarcely indented; secondary plate of the left mandible small, curved; spine-row of three small spines, behind these a long tract of fur leads to and partially lines the molar tubercle, the crown of which is minutely denticulate, strongly directed backwards, and carrying a furry tuft above; the palp is set forward, over the front of the molar tubercle, its first joint short, the second rather stout, with some five small spines on the inner margin near the apex, and three or four along the upper half of the outer margin; the third joint much curved, a short piece of its inner margin clear, the remainder fringed with eight and twenty spines, the first twenty-one pectinate on the upper border, the other seven longer, near and at the apex, pectinate below; a single long spine or seta near the outer margin close to the base.

Lower Lip.—Apical margins of the forward lobes broad, somewhat squared, much ciliated, little dehiscent.

First Maxillæ.—Inner plate small, with two unequal plumose setæ on the apex; outer plate with very oblique apical margin; of the eleven spines that which stands innost has seven marginal teeth, the next above it four; these are somewhat isolated; of the rest the outer are the stoutest, with one, two, or three marginal teeth; one about central has seven; the second joint of the palp has six or seven small teeth on the apex and one spine or short seta; below the palp the shaft has on its outer border some groups of long setæ.

Second Maxillæ.—Outer plate decidedly longer than the inner; the long curved spines on its apical border are followed by a row of small ones continued some little way down the outer border; on the inner plate the spines and setæ of the very oblique apical border are terminated by a long plumose seta.

Maxillipeds.—Inner prismatic[1] plates broad, reaching nearly to the apex of the first joint of the palp, the plumose setæ in the usual position, the apical border almost squared, with three close-set teeth, followed by four curved spines decreasing in size as

[1] The epithet *prismatic* was applied to these plates first, I believe, by Kroyer; it refers to that which an unshaded diagrammatic drawing cannot show, namely, that to a spectator looking upon the inner surface of the maxillipeds the inner edges of these plates are almost invariably nearer, sometimes much nearer, to the eye than their outer edges.

they pass round to the outer margin, on which lower down there is a fifth; below the corner tooth on the outer side of the plate are two strong spines; the broad outer plates, reaching nearly to the apex of the second joint of the palp, have on the inner margin a score of small teeth set close together, followed by a separate single tooth on the apical margin, which in turn is followed by eight spines passing round the apical and some way down the outer margin; the second joint of the palp is a little longer than the first and much longer than the third; the finger is not very long.

First Gnathopods.—Side-plates very broad, broader above than below; first joint extending beyond the side-plate, broad, with setæ extending down about two-thirds of the front margin; the third joint with a short front margin and a long hinder one, which is furred, and near the produced pointed apex carries a row of spines; the wrist rather shorter than the hand, has the long front margin clear, except for the row of long spines about the apex; the hinder margin is furred and also has spines about the apex; there is a ridge or pocket on the inner side parallel with the furred part of the margin; the hand is broad and long, at the base nearly as broad as the wrist distally, furred on the hinder margin near the base, and here having on the side a ridge or fold of the skin parallel with the margin; there are various groups of spines or setæ on the hind margin and surface of the hand and at the front apex; the finger closes down between the two spines, which define the sloping apical palm.

Second Gnathopods.—Side-plates widening downwards, at the top much less wide than those of the first pair. Branchial vesicles expanding greatly from a narrow neck, narrowed below; marsupial plates moderately broad. First joint extending much beyond the side-plate, equal in length to the third, fourth and fifth joints together, with a few setæ on the front margin; second joint as long as the wrist; third joint shorter, front margin free for some distance, hind margin furred below, and with a large group of long, thin spines on the rounded apex; wrist very lightly furred anteriorly, but strongly behind, also towards the distal end carrying numerous groups of slender spines of various lengths; one such group at the apex in front; the hand shorter than the wrist, but elongate, the sides but little curved, much furred all along, while the centre of the surface on both sides of the hand is naked or nearly so; in addition to the furring, both edges and adjacent parts of the hand are crowded with groups of spines, those in front when they reach the apex standing out far beyond the finger; they are pectinate, very slightly curved; the finger is very small, closing down on a palm, the outer part of which is nearly straight, at right angles to the hinder margin of the hand.

First Peræopods.—Side-plates with the hind margin straight; marsupial plates expanded a little below till near the apex, having on the lower half and apex numerous very long setæ in front and a few short ones behind. First joint of the limb not reaching the lower rim of the side-plate; third joint longer and stouter than either the fourth or fifth, slightly decurrent in front, with groups of long, slender spines or setæ on the hinder margin,

and the apex in front; the fourth joint similarly armed, stouter than the fifth, in length subequal to it; the fifth with numerous short as well as long setiform spines on the hinder margin; two very short ones at the junction with the slightly curved finger.

Second Peræopods.—Side-plates excavate far down, the lower margin curving up to the excavation so as to form a rounded point. Branchial vesicles broad except at the neck. Joints of the limb similar to those of the preceding pair.

Third Peræopods.—Side-plates rather wider than deep, front margin very convex, hind margin nearly straight. First joint a round oval, broader above than below, the rounded lower margin behind reaching as far down as the second joint, front margin with numerous spines fringing it entirely, hind margin serrate; third joint much longer than broad, somewhat decurrent behind, with spines at the back, spines and setæ in front, and apical groups of spines; fourth joint scarcely so long as third, similarly armed; fifth joint much narrower but longer than fourth, with eight sets of spines on the front margins, some spinules on the back border; finger about half the length of the fifth joint, slightly curved.

Fourth Peræopods.—First joint a long oval, narrower below than above, spines on the front margin few and small on the upper part, numerous and longer below, hind margin serrate; third joint as in the preceding pair, but somewhat longer; fourth joint longer than third, with nine groups of spines on the front border; fifth joint scarcely shorter than the fourth, with ten groups of spines on the front border; small spines on the hind margins of third, fourth and fifth joints; finger not nearly half as long as the fifth joint.

Fifth Peræopods.—Branchial vesicles a broad oval, with the hind margin drawn out into somewhat pointed processes. First joint broadly oblong with rounded corners, the front margin as in the preceding pair, the hind margin serrate, rather deeply at the lower part; the third joint shorter and narrower than in the two preceding pairs, with four groups of spines in front, and four behind; fourth joint longer than third, with eight groups of spines in front, three behind; fifth joint longer than fourth, with nine groups of spines in front, five behind, these latter being all very small, except the apical; finger not half the length of the fifth joint.

Uropods.—Peduncles of the first pair longer than the rami, rami subequal, stiliform, spines numerous on the peduncles and also on the rami. Peduncles of the second pair a little longer than the rami; the rami stout, the outer somewhat longer than the inner; marginal spines numerous. Peduncles of the third pair shorter than the rami, the rami broadly lanceolate, almost equal, extending much further back than the second pair; spines on both edges; plumose setæ also on one.

Telson long, extending far beyond the peduncles of the third uropods, cleft for more than four-fifths of its length, narrowing distally, a series of five spines along each side; in each apical cleft two spines, of which the outer is the larger.

Length.—The specimen, in the position figured, measured, without the antennæ, three-quarters of an inch; with the outstretched antennæ, an inch.

Locality.—Station 150, off Heard Island, February 2, 1874; lat. 52° 4′ S., long. 71° 22′ E.; depth, 150 fathoms; bottom, coarse gravel; bottom temperature, 35°·2. One specimen, female. Dredged.

Remarks.—The specific name refers to the singularly stout and stiff antennæ.

This species agrees well with Boeck's definition of his genus *Tryphosa*, except that the outer plate of the maxillipeds does not reach beyond the second joint of the palp, in which respect it agrees better with his definition of the genus *Anonyx;* on the apex the plate in question is armed with the requisite two spines, but it has more than two. In *Anonyx* the inner plate of the second maxillæ is much shorter than the outer plate, which is not the case in *Tryphosa*, but beyond this it is not easy to find any character on which absolute reliance can be placed for distinguishing the two genera. Boeck, in his account of *Tryphosa*, compares it only with *Orchomene*, but when discussing the genus *Anonyx*, he says,[1] "the mouth-organs in this genus show a certain agreement with those in some of the following genera, especially in *Orchomene*, *Tryphana* [*? Onesimus*], and *Tryphosa;* the upper lip in them all is helmet-shaped and covers the tips of the mandibles with its thickened end. These genera differ, however, from one another in the form of the other mouth-organs, the antennæ, the two pairs of gnathopods, and the telson. Thus, the mandibles in *Anonyx* are very strong but not especially elongate, with a long but narrow molar tubercle, and the palp is fixed nearer the end than the molar tubercle. The first maxillæ are also very broad, but the inner plate is very short, only a little longer than broad, with two strong plumose setæ on the apex. The plates of the second maxillæ are also short but broad; the outer plates of the maxillipeds are very large, and have on the rims a close row of small nodules. The third joint of the lower antennæ is short, and the first gnathopods are more or less elongate. The telson is also elongate, longer than the peduncle of the last uropods, and deeply cleft. The body is also on the whole tolerably elongate, and the fifth side-plate accordingly longer than deep."

Tryphosa barbatipes, n. sp. (Pl. VII.).

The lateral lobes of the head much produced and sharply angled.

Postero-lateral angles of the third pleon-segment not acute and yet scarcely rounded. Fourth pleon-segment with a dorsal depression.

Eyes not discerned.

Upper Antennæ.—First joint tumid, second and third short, the third, as is often the case in the Lysianassidæ, excavate below; flagellum of eight joints, the first large, slightly

[1] De Skand. og Arkt. Amph., p. 151.

tapering, considerably longer than the other seven together, having the cylindrical hairs of the brush not very long, and carrying two spines at, and one spine near, the apex; the other joints diminishing successively in breadth, and towards the end in length also; the secondary flagellum of four joints together equal in length to the first of the primary.

Lower Antennæ.—Gland-cone prominent, third joint somewhat inflated, in length equal to the composite first and second joints, fourth and fifth subequal, both with small cilia above and setæ below; the flagellum tapering, probably consisting of seven or eight joints; in the specimen (female) examined there were five left on one member of the pair and six on the other.

Mandibles.—The cutting edge smoothly convex, bounded by a very small tooth above, pointed downwards, and an equally small one below pointing forwards; above this in the left mandible is a minute tubercle breaking the evenness of the convex edge, but this is probably only an individual peculiarity; the top border over the upper tooth is minutely serrate; the secondary plate of the left mandible is short and small, dilated forwards and apically cut into five or six minute denticles; the spine-row consists of three slender spines; the molar tubercle is prominent, the dentate crown pointing backwards, oval, with three central teeth apart from the lines of denticles; the region between the spine-row and the crown furred with cilia, a long group of these also above the crown; the palp not far back, over the molar tubercle's front part, the first joint short, the second with nine spines near the apex; the third joint with the first subequal in length to the second; more than the first third of its inner margin smooth, the remainder fringed with fifteen spines; one spine near the base on the outer side. Behind the palp and molar tubercle the shaft of the mandible is broad.

First Maxillæ.—Inner plate short and narrow, with two unequal plumose setæ on the apex; outer plate long, two of the spines a little below the apical margin, the inner of the two with fifteen rather elongate teeth, the other spines much crowded together, nine in number, strong, the outer less dentate than the inner, the longest of all in company with a short one standing nearest to the two first mentioned; the second joint of the palp narrower proximally and distally than in the middle, its apical border set with seven spine-teeth serrate on the outer border, a single seta near the outer apex.

Second Maxillæ.—Outer plate longer and broader than the inner, apical margin oblique, with pectinate spines increasing in length to the apex on the outer side, a few shorter ones following down the outer border; apical border of the inner plate likewise oblique, armed with spines, a plumose seta on the inner margin just below the spine-row longer than any of the spines.

Maxillipeds.—Inner plates not reaching the apex of the first joint of the palp, with plumose setæ planted in the ordinary manner on the inner margin and passing across to the outer corner of the apical; apical border with three strong teeth, the innermost the most prominent, beyond these a plumose spine or seta distinct from the series just mentioned;

outer plates reaching as far as the second joint of the palp or a little beyond, with ten strong teeth on the inner margin set close together, an eleventh on the apical margin separated by a short interval from the rest, and beyond this two spiniform teeth; second joint of the palp not longer than the first, the third joint shorter; the finger short, with a rather long nail accompanied by three cilia, the usual dorsal cilium rather nearer the origin of the finger than that of the nail.

First Gnathopods.—Side-plates broader above than below, very convex behind, with a slight concavity in front. First joint extending much beyond the side-plate, fringed with long setæ in front; third joint with no free front margin, some groups of setæ on the hind margin; wrist subtriangular, much shorter than the hand, and scarcely broader distally than the base of the hand, very setose on the free hinder margin and the contiguous portion of the inner side; hand oblong, longer than the three preceding joints combined, a little broader at the base than at the palm, front margin continuous with that of the wrist, having few setæ except at the apex, while the hinder margin and contiguous inner side are densely setose with plumose setæ; palm a little concave, bounded by two stout spines with fine curved tips; along the palm are close-set straight cilia, and a row of longer cilia not close set; the finger just the length of the apical margin of the hand, with one tooth on its inner edge, and a dorsal cilium near the base.

Second Gnathopods.—Side-plates of very even width throughout. Branchial vesicles large and broad except at the neck. First joint a very little wider below than above, scarcely curved, the setæ on the front margin fewer and much shorter than in the preceding pair; the second joint nearly as long as the wrist; third much shorter, a little furred behind, with spines on the rounded apex; the wrist furred on the hinder margin, with little fan-shaped scales on the breast, and long pectinate spines near the apex; the hand furred but not densely, somewhat narrowed proximally and distally, the hinder margin a little outdrawn, the overarching spines of the front and apical margins and those of the hinder margin having their pectinations confronting in each set those of the other set; the palm sloping inwards, microscopically pectinate, the minute finger neatly fitting it with its inner edge also for the distal half microscopically pectinate, and carrying a dorsal cilium on the thick portion near the hinge. The tip of the finger closes down against spines at the outer end of the palm; it is probable that this is the case in all species of this family, but in regard to many the fact is not mentioned from the difficulty of observing such spines with certainty in the midst of the dense fur sometimes present.

First Peræopods.—Side-plates long, slightly widening downwards. Branchial vesicles broad, seemingly without folds. Marsupial plates, in this specimen, narrow, with few setæ. First joint reaching about as far as the side-plate; third joint much longer than fourth or fifth; fourth scarcely so long as fifth; the third and fourth bordered behind with groups of setæ of various lengths; in the fifth the groups consist of a spine with a

long accessory thread and a seta, two short straight spines adjoining the hinge of the finger on the inner side; the finger short, little curved, with a small nail, the dorsal feathered cilium near the hinge.

Second Peræopods.—Side-plates of considerable breadth below. The joints of the limb scarcely distinguishable from those of the preceding pair.

Third Peræopods.—Side-plates a little outdrawn below in front, length and breadth subequal; first joint elongate but not narrow, broader above than below, the rounded lower margin behind descending below the second joint, front margin spined, with a few setæ, the hinder margin not strongly serrate; the third joint expanded, hinder angle outdrawn downwards; fourth joint narrower, perhaps a little longer; fifth joint narrower and a little longer than the fourth; finger short, curved.

Fourth Peræopods.—First joint similar to that of the preceding pair but larger, not drawn out below the second joint; the third joint much longer than in the preceding pair, and less expanded in proportion to its breadth; the fourth joint longer than the third or the fifth, which are subequal; finger short, but longer than that of the preceding pair; the whole limb considerably longer than the pair preceding or the pair following.

Fifth Peræopods.—The first joint longer and much broader than in the preceding pairs, the third joint shorter and less expanded, the fourth equal in length to that in the third pair, but narrower; the fifth joint and the finger rather longer than those in the third pair. In these three pairs of limbs the armature is similar; on the hind borders of the third, fourth and fifth joints some small spines, with larger ones apically; setæ and spines on the front margins of all the earlier joints, spines only on the fifth; a rather large group of spines on the front apex of the fourth joint.

Pleopods.—The coupling spines on the peduncles exhibit a row of three marginal retroverted teeth; the joints of the rami number from fifteen to seventeen; the cleft spines form a series of four in the first pair and the second, of three in the third pair.

Uropods.—Peduncles of the first pair longer than the rami, rami stiliform, a little curved at the tips, with four or five marginal spines; peduncles of the second pair equal in length to the rami, the rami equal; the peduncles of the third pair subequal in length to the inner ramus; the rami short, broadly lanceolate, the outer exceeding the length of the inner by nearly the length of its nail, the inner having no nail or only a rudiment.

Telson extending beyond the peduncles of the third uropods, cleft for more than two-thirds of its length, widening from the base to a level with the top of the cleft, then narrowing with convex outer margin to the apices, which are more outdrawn on the outer than the inner edges, between the two angles each containing a strong spine with accessory thread; on each side is a small spine nearly on a level with the top of the cleft, and lower down a larger one.

Length of the specimen, in the position figured, about seven-twentieths of an inch.

Locality.—Station 149H, off Cumberland Bay, Kerguelen, January 29, 1874; depth, 127 fathoms; bottom, volcanic mud. Dredged.

A minute specimen, not a tenth of an inch long, from the same locality, is probably the young of this species. Two other specimens were taken at Kerguelen, at a depth not mentioned.

Remarks.—The specific name alludes to the bearded appearance of the wrist and hand in the first gnathopods.

In the young specimen there are clear traces of eyes, the mandibles are well developed, but with few spines on the palp; on the palp of the first maxillæ there are only four teeth; on the inner plate of the maxillipeds the three apical teeth are well developed, but the outer plate has on the inner margin but one tooth, which is that near the apex, and two on the apical margin; the branchial vesicles are narrow; the fingers of the peræopods comparatively more developed than in the adult.

Genus *Hippomedon*, A. Boeck, 1870.

For Boeck's definition of this genus, see Note on Boeck, 1870 (p. 397). To embrace the new species here assigned to the genus, the first maxillæ should be described as having two *or more* setæ on the inner plate, and the epithet *broad* should be omitted from the account of the maxillipeds. The description of the lower antennæ as having the fifth joint much longer than the fourth must be cancelled, being in fact contrary to the descriptions which Boeck himself gives of the only two species which he assigns to the genus.

Hippomedon kergueleni (Miers) (Pl. VIII.).

1875. *Lysianassa kergueleni*, Miers, Ann. and Mag. Nat. Hist., vol. xvi. p. 74.
1879. *Anonyx kergueleni*, Miers, Transit of Venus Exped., Zoology of Kerguelen Island, Crustacea, pp. 8, 9, pl. xi. fig. 4.

Lateral lobe of the head acute, produced some distance along the first joint of the upper antennæ. Third segment of the pleon with the postero-lateral angles much prolonged and curved upwards as narrow pointed lobes. Fourth pleon-segment with a dorsal depression. There are some small scattered hairs upon the back.

Eyes not discerned.

Upper Antennæ.—The first joint long, stout, cylindrical, with a row of minute cilia near the base, and some larger feathered ones on the opposite margin, distally, such being scattered also on the two following joints, which are very short, narrowing distally; flagellum of fourteen joints, the first as long as the four following combined, carrying the usual

brush of filamentary cylinders[1] beneath ; the other joints furnished with cilia, and some of them with cylinders ; the accessory flagellum of five joints, of which the first is the longest.

Lower Antennæ.—Third joint as long as first and second united, and but little shorter than the fifth ; fifth a little shorter and narrower than the fourth ; gland-cone prominent, as can be seen when the antennæ are disengaged from the head ; flagellum of sixteen articulations. Feathered cilia on the fourth and fifth joints of the peduncle, besides smooth setæ of various sizes.

Mandibles.—The palp set very far forward ; the cutting edge evenly convex, with a small projection at the top ; secondary plate of left mandible narrow, seemingly a little dentate at its slightly dilated apex ; spine-row of three small spines or stiff curved setæ ; molar tubercle with the dentate crown oval, not strongly outdrawn backwards as in *Anonyx cicadoides ;* palp with first joint very short, second joint very long, with slight bend or constriction below the centre, and a row of seven spines near the apex ; the third much shorter joint has twelve short spines along the margin, followed by six more successively increasing in length to the apex ; not far from the base, at and near the convex margin, there are two or three long setiform spines ; the surface of this joint is as usual striated with closely adpressed cilia.

Lower Lip ciliated as usual on the forward apices ; the outer margins and mandibular processes in the specimen figured quite smooth.

First Maxillæ.—Inner plate slender, ovate, apically furnished with two plumose setæ, the inner much the smaller ; outer plate broad, carrying on the obliquely truncate apex six dentate spines, and others, probably five, in a second row below these ; the second joint of the palp is laminar, much curved, overarching the outer plate, having its slightly narrowed apical margin fringed with twelve to thirteen teeth pectinate on the outer edge, and one cilium or small seta near the margin. In describing these maxillæ, Mr. E. J. Miers[2] uses the following words, "the outer lobe strong, truncate, armed at the apex with three or four spines." When the part in question is examined with a low power, this would be the natural way to describe it, but under a high power of the microscope it can be seen that the spines are much more numerous, those actually at the apex numbering six very much crowded together, and in the specimen here described very blunt at the tips. That this bluntness is only the effect of wear is clear from the sharply-pointed new spines which can be discerned within the plate.

Second Maxillæ.—The plates rather narrow, the outer a little longer than the inner, the apices with the usual fringes of pectinate spines, which pass rather further down the inner margin in the inner plate than in the outer ; on the inner plate the row terminates with a plumose seta.

The Maxillipeds narrow, not broad at the base as might be inferred from the figure,

[1] By the expression *filamentary cylinders* or *cylindrical setæ* I mean the organs now generally regarded as olfactory.

[2] *Loc. cit.*, p. 8.

which represents the two halves much flattened out; inner plate reaching a little beyond the first joint of the palp, having three teeth on the apical margin, the plumose setæ commencing near the middle of the inner margin, and passing round to the outer corner of the apical margin, but not continued down the outer edge; none of them large; the outer plate reaching much beyond the second joint of the palp, its inner border (beginning from the base) carrying a cilium, then a setiform spine, then a spine, then two microscopic teeth, then a close row of thirteen small teeth, those at the curve of the apex being the largest, beyond these the curved outer margin apparently quite naked; there is a row of five little spines on the side of the plate, a little removed from the inner margin; of the palp-joints the first is longer than the third, the second longer than the first, the fourth or finger provided with a sharp nail.

First Gnathopods.—Side-plates very little dilated below; first joint almost straight, sparingly setiferous in front; third joint with the emarginate front border much shorter than the hind border, which has a group of setæ near the apex; the wrist rather longer than the hand, nearly half of its hinder margin coinciding with the distal margin of the preceding joint, the remainder parallel with the front margin, slightly furred and carrying two groups of setæ; the hand almost parallel-sided, like the wrist having some groups of setæ near the front border, and a conspicuous group at its apex, on the hinder border having four groups; the sloping, rather convex palm, microscopically pectinate, defined by a spine, bordered with spiniform cilia, in addition to two linear groups of setæ, and close to the hinge of the finger two minute spines; the finger, besides the usual cilium on the back near the hinge, has one about the middle of its inner margin; this margin develops a small tooth near the origin of the nail, two cilia taking rise at this point.

Second Gnathopods.—Side-plates and the first joint of the leg a little longer and narrower than those of the preceding segment; branchial vesicle with a broadly rounded upper lobe rising above the neck, the central part of the vesicle having the twist of a screw, the lower part narrowing rather abruptly;[1] marsupial plate narrow; second joint as long as the wrist; third joint short, furred behind, apically somewhat rounded, and carrying a group of pectinate spines; wrist much longer than hand, densely furred behind, less so in front; pectinate spines near the lower end of the hinder margin; hand long-ovate, densely furred, numerous pectinate spines of very various sizes arrayed on both borders, especially in front apically, the pectination and curvature in both sets being directed towards the finger; the finger itself, as so commonly in this family of the Amphipoda, minute, almost lost in the surrounding forest of spines, broad at the base, then narrowing suddenly, the inner edge of the narrowed part microscopically pectinate and produced into a tooth, over which the nail bends, with cilia at its base; there is also a cilium on the back of the finger.

[1] The figure, Pl. VIII. *gn.* 2., unfortunately does not show or even suggest the details above described, but only gives the shape of the vesicle flattened out and mounted on a slide for the microscope.

First Peræopods.—Side-plates a little broader and longer than those of the preceding pair; branchial vesicle from a small neck swelling out into a broad sac with a narrow terminal lobe; first joint of the leg with the front margin straight; third joint stouter and much longer than the fourth, but little produced downwards; fourth joint stouter than fifth, subequal to it in length; fifth joint naked, like the two preceding, on the forward margin except at the apex; on the hinder margin all three have groups of spiniform setæ, one long one at the apex of the fourth joint and some shorter ones on the border of the fifth seeming to be truly spines; the finger long, narrow, slightly curved, with edges bare except for the feathered cilium on its back near the base.

Second Peræopods.—Side-plates broad below, excavated above; the marsupial plates in this and in the preceding segment long and very narrow (in the specimen figured); the joints of the leg like those of the preceding pair.

Third Peræopods.—The branchial vesicle broad and squared above, curling round in a narrow lobe below, with a long thin accessory vesicle starting from the base. First joint very broad, slightly broader above than below, lower margin behind with a deep rounded lobe overlapping the next joint, the lateral margins very little curved; the third joint short, broad, somewhat decurrent behind, with spines on the hinder margin, spines and fine setæ on the front margin; fourth joint ovate, somewhat shorter and much narrower than the preceding, garnished in like manner; fifth joint slender, longer than the fourth, with few spines; finger long, thin, little curved, seemingly quite naked.

Fourth and *Fifth Peræopods* similar in general structure to the third, but with the first joints longer and about the same breadth, the third joint in the fifth pair less dilated, the fifth joint longer in proportion to the finger. As the dorsal cilium of the finger is here present, it may be only accidentally missing from the third pair. Branchial vesicle of the fourth pair was on one side of the specimen not unlike the accessory vesicle of the third, but curved instead of straight, and at the top broader, as also in the somewhat narrowed middle part, while the terminal part is thinner; on the other side the lower part of the branchia was expanded. The branchial vesicle of the fifth pair is quite small, irregularly shaped both as regards the neck lobe and the larger terminal one, which has the appearance of being attached to the other by one corner.

Pleopods.—In the coupling spines the apex is rounded, undilated; the lateral retroverted teeth are two in number; on the large basal joint of the inner ramus there are three cleft spines of the usual form, as described in the account of *Cyphocaris micronyx* (p. 660); the joints of the rami are from sixteen to twenty in number, the outer ramus apparently as a rule having one or two more joints than the inner.

Uropods.—The first pair have the peduncles somewhat longer than the rami; the outer ramus rather longer than the inner; both stiliform, slightly curved at the tips; in the second pair the peduncle is rather shorter than the rami; these are subequal, each, as

in the preceding pair, armed with three spines along the proximal part of the upper border; in the third pair the peduncle is short, the rami slenderly lanceolate, the outer and longer branch terminating with a nail, having five spines along one of its margins, on the other two spines and one or two setæ near the nail; the inner branch with spines and setæ along one margin, and some spines near to the other margin.

Telson.—Cleft nearly to the base, evenly narrowing to the apex, each half of which is emarginate, the inner part more produced than the outer, and carrying a spine and a feathered cilium in the hollow; three spines are placed at intervals on the surface of the telson near each outer margin.

Length.—The specimen figured measured, without the antennæ, about two-fifths of an inch.

Locality.—Station 149, Accessible Bay, Kerguelen Island, January 9, 1874; depth, 20 fathoms; bottom, volcanic mud. Dredged.

Station 149H, off Cumberland Bay, Kerguelen Island, January 29, 1874; depth, 127 fathoms; bottom, volcanic mud. Several specimens. Dredged.

Remarks.—Mr. Miers, in the Zoology of Kerguelen Island, p. 9, says :—

"In the form of the antero-lateral angles of the cephalon, and of the postero-lateral angles of the third segment of the pleon, this species to some extent resembles (1) *Hippomedon holbölli*, Kröyer, as described by Boeck, as well as (2) *H. abysii* [*abyssi*], Goës, and (3) *Anonyx pumilus*, Lilljeborg,—all from the Northern Seas. But it differs from these species in having the inner lobes of the maxillipedes proportionately much longer; and in this respect it approaches more nearly to the type of structure exhibited in *Orchomene*, Boeck. The eyes also, which are well marked in the species just referred to, are not visible in any of the specimens of *A. kergueleni*.

"On account of the subcheliform character of the first pair of the gnathopoda, and the divided telson, I refer this species to the genus *Anonyx*, as defined by Mr. C. Spence Bate, instead of retaining it in *Lysianassa*, where I placed it at first. I cannot refer it with certainty to any one of the numerous genera recently established by Boeck in his systematic arrangement of the Scandinavian and Arctic *Amphipoda*; I believe, indeed, that it will be found necessary to introduce important modifications of the systematic arrangement and generic characters proposed by this author into any general revision of this difficult order, which may hereafter be undertaken, based upon the comparison of species from foreign as well as the European and Arctic Seas."

A specimen, however, of *Hippomedon abyssi* (Goës), from the "Valorous" Expedition, lent me by Canon Norman, shows both the inner and outer lobes of the maxillipeds corresponding in their proportions with those of the present species, which I have therefore transferred to the genus *Hippomedon*, where Mr. Miers himself seems to have had some disposition to place it.

Hippomedon trigonicus, n. sp. (Pl. IX.).

In many respects this species shows a very close resemblance to *Hippomedon kergueleni* (Miers), although there are peculiarities which have induced me, after some wavering, to keep it distinct. In the present form the postero-lateral angle of the third pleon-segment is but little, instead of greatly, curved upwards. Of the fourth pleon-segment the proximal portion is very convex, the depression being distal, so that the end of the segment forms a raised angular apex rising above, instead of forming a continuous curve with, the following segment.

It originally appeared to me that the dorsal depression in *Hippomedon kergueleni* was in a marked manner proximal, and in the form now under consideration conspicuously distal, but I find in this and many other species of Amphipods that the dorsal appearance of the fourth pleon-segment is very essentially altered according as the pleon happens to be more or less extended or flexed. In the state of extension the proximal portion of this segment often telescopes far into the third segment, sometimes completely hiding a dorsal depression, and at others making such a depression appear proximal, when in regard to the whole dorsal length of the segment it is in fact distal or central.

The other differences between the two forms may be judged of from the following account.

Upper Antennæ.—The peduncles comparatively slender, the first joint longer in proportion to its breadth than in the form already described; the flagellum consisting of eleven joints, the first equal in length to between two and three of those succeeding it; the secondary flagellum of three joints, of which the first is not quite so long as the first of the primary.

Lower Antennæ.—Gland-cone prominent, third joint equal in length to the fifth; fourth joint decidedly longer than either; flagellum nine-jointed.

The Mouth-Organs appear to be in close agreement with those previously described. In the specimen examined there were fewer teeth on the apex of the palp of the first maxilla.

First Gnathopods.—There seems to be no difference of importance except in the shape of the side-plates, which are here of less regular form, shorter and stouter, outdrawn in front below. At the beginning of the palm of the hand there are two spines.

Second Gnathopods.—In this species the wrist is a little plumper distally, hand and wrist both densely furred, but the distal spine-armature of the hand both at front and back less important than in the other species.

Second Peræopods.—What may be called the shank of the side-plate is here somewhat longer in proportion to the broad lower portion.

Third Peræopods.—First joint more contracted below, and with margins more curved, so as to have an oval rather than the square appearance presented in the other species; the third and fourth joints longer compared with their breadth.

Fifth Peræopods.—The front margin of the first joint is here almost absolutely smooth for the upper two-thirds of its length, while in the other species it is spined almost through its whole length; on the other hand the cilia on the postero-distal curve are here more numerous. The fingers in this species are less slender than in the other.

Pleopods.—Two very small coupling spines, with a row of three back-turned teeth along the margin; the inner ramus with twelve, the outer with fourteen joints, the first of the outer fringed as in the companion species with numerous plumose setæ, the first of the inner with the cleft spines three in number.

Uropods.—In the first pair there are four spines on the margin of the outer ramus, and five on that of the inner, leaving a comparatively small terminal portion free from spines; in the second pair the outer branch has four, the inner three, spines; in the third pair the outer branch has three spines on one margin, and on the other one at the base of the nail; this branch is not longer than the peduncle, the other, which is much shorter, has but one spine.

Telson.—This, though similar in the details of its structure to that of *Hippomedon kergueleni*, is extremely different in its proportions, being in fact but little longer than its greatest breadth.

It is not very safe to establish new species upon small differences in the relative lengths of joints of the antennæ and limbs, or upon variations in the number of spines that form a marginal row, since these discrepancies and such as these may be due to age or sex or individuality, but in the present instance it must be noticed that in regard to the two forms named *Hippomedon kergueleni* and *Hippomedon trigonicus*, specimens of the same sex have been compared, and that the more striking form of the fourth pleon-segment, and the larger number of spines on the first and second uropods, belong to the smaller, not to the larger species.

Length, one-quarter of an inch without the antennæ.

Locality.—Kerguelen Island; depth not specified.

Remark.—The specific name *trigonicus*, triangular, refers to the shape of the hump on the fourth segment of the pleon.

Hippomedon miersi, n. sp. (Pl. X.).

Lateral lobe of the head produced into a rounded angle. Postero-lateral angle of the second segment of the pleon slightly acute, of the third segment rounded. The fourth segment with a dorsal depression, the sixth segment with dorsal ridges on either side of the telson.

There seemed to be a faint indication of eyes.

Upper Antennæ.—First joint short, tumid; second and third joints very short, the third a little outdrawn above; flagellum of eleven joints, the first subequal to the remainder united, and longer than the four-jointed secondary flagellum; on the first joint of the peduncle a spine-like feathered cilium on the central bulge below, longer feathered cilia on its distal border, and on the next joint; the usual brush on the first joint of the flagellum, this joint being distally drawn out into a little sharp tooth; calceoli on several of the small joints.

Lower Antennæ.—First three joints short, gland-cone twisted round towards the first joint; third joint shorter on the inner than the outer side; fourth and fifth joints furred above, fifth longer and thinner than the fourth; flagellum of some thirty-eight joints, with small calceoli seemingly only on every alternate joint.

Mandibles.—Cutting edge as usual convex, with a small projection above, the rounded part below perhaps a little indented behind; the secondary plate on the left mandible a little curved, bluntly pointed, too broad to be called spine-like, probably in a worn condition; spine-row seemingly of three small spines; molar tubercle prominent, the crown rather elongate; the palp long, set as far forward as the front of the molar tubercle, the second joint but little longer than the third, thirteen spines at the distal part of the second joint, in the third joint one spine at the back close to the base, on the opposite border nearly a third part free, the row of spines consisting of twelve decreasing, followed by six or seven increasing, in length successively towards the apex.

Lower Lip as in the next species, *Hippomedon geelongi.*

First Maxillæ.—Inner plate not very large, with two plumose setæ on the rather broad apex, the inner one much smaller than the outer; outer plate with eleven dentate spines crowded on and about the apical margin, the inner margin furred distally, the spines near to the inner margin slender, with numerous teeth, the outer more stout with few teeth; the palp over-arching the outer plate, with nine teeth round its apical margin, increasing successively towards the centre, pectinate on their concave outer edges; one seta projects near the outer apical angle.

Second Maxillæ.—The outer plate longer than the inner, the sloping apical margins of both fringed with rows of pectinate spines; on the inner plate there are stiff plumose setæ as well as spines, and a little below the apex a larger and proportionately less stiff plumose seta on the inner margin.

Maxillipeds.—The inner plates reach about to the apex of the first joint of the palp, with three teeth followed by two curved ciliated spines on the apical margin, and one tooth on the inner margin just below the apex; the outer plates reach as far forward as the second joint of the palp or a little further, the ten teeth of the inner and apical margins increasing in size towards the apex, at which the ninth is the longest, though thinner than the eighth, while the tenth is both shorter and thinner than the ninth; the second joint of the palp is but little longer than the first; the third joint is much shorter

than either; the finger with its sharp curved nail is as long as the third joint; it has some cilia near the nail, and a dorsal cilium much nearer the nail than the base.

First Gnathopods.—Side-plates small, long-oval, narrowest at the lower end. First joint strong, projecting much beyond the side-plate; third joint very short in front, much longer behind; the wrist not so long as the hand, and scarcely broader, widened beyond the triangular portion which adjoins the third joint, and furred on the hind margin of the widened part; the hand long, nearly parallel-sided, with a slight curve, hinder border scarcely furred, some setæ on both margins and on the side; palm sloping, a little convex, defined by two spines with stout accessory threads; between these spines the finger closes down neatly fitting the palm, and having a tooth on the inside just before the nail is reached.

Second Gnathopods.—Side-plates deeper than those of the preceding segment, much wider below than above; first joint long, widening a little and curving backwards as it approaches the long second joint; third joint shorter than second, furred about the middle of the hinder margin, which carries near the apex long slender spines or setæ of geniculate appearance; the wrist but little longer than the second joint, furred both before and behind, and with long slender spines near the apex on both sides; the hand much shorter than the wrist, oval, densely furred, with the usual armature of spines; the finger very small, set pretty well clear of the anterior group of spines, lying close to the produced hinder portion of the hand which provides the palm.

First and Second Peræopods.—Side-plates of the first similar to the preceding pair, but larger, side-plates of the second much wider below than above; first joint just reaching the lower rim of the side-plate; third joint nearly parallel-sided, scarcely produced downwards, considerably longer than the fourth joint, both fringed posteriorly with setæ, which increase successively in length towards the distal end of the margin; the fifth joint as long as the third, but much thinner, gently curved, posteriorly armed with spines and setæ, and carrying close to the hinge joint of the finger a pair of spines shorter than those above, blunter, and seemingly with fine backward serratures. Finger about half the length of the hand in the first peræopod. In the second peræopod the third joint and the hand are rather shorter than in the first.

Third Peræopods.—Side-plates rather broader than deep. First joint as broad as side-plate, length and breadth about equal, narrowed below, the distal curve behind produced nearly to the end of the second joint, convex front border set with spines and setæ; third joint dilated, not longer than the fourth, except for the produced infero-posterior angle; fourth joint more dilated above than below; fifth joint longer than fourth, much narrower, a little curved, with five pairs of spines on the anterior margin; finger rather long and slender.

Fourth Peræopods.—First joint a long oval, most of the front border spined; the third joint shorter than either of the next; fourth a little wider but shorter than the

fifth, a row of four rather long spines on its front margin, each between two short ones; the fifth with five sets of spines on the front, each consisting of a long and a short spine, except the lowest set, in which the spines are equal. The finger is long and slender, curved near to the small nail.

Fifth Peræopods.—First joint broader and longer than that of the preceding pair, widest above; third joint not dilated; rest of limb missing. The branchial vesicles were not in a good state for observation; they presented many irregular folds, and the usual gradations of size.

Pleopods.—So far as examined these correspond very nearly with those described for *Hippomedon geelongi*. Six cleft spines were observed on one of the rami.

Uropods.—Peduncles of the first pair longer than the rami, outer ramus rather longer than the inner, small spines on the upper margins, four on the outer ramus, three on the inner, a short bright nail at the tip; in the new rami in a state of preparation within the old this bright nail makes itself conspicuous, as though it were already a part of the outward armature (see fig. *ur*.2.). Peduncles of the second pair shorter than the rami, which are similar to those of the first pair, except that they are shorter without being less broad; peduncles and rami of the third pair shorter than those of the second pair, though not greatly so; outer ramus longer than inner, with some small spines along the side; each ramus ends in a small nail to which it rather abruptly narrows, and each has the border fringed with very long plumose setæ.

Telson.—Much longer than broad, cleft about four-fifths of its length, distally narrowing a little, but so as to leave both divisions broad-ended. In a small emargination at the outer part of each apical border is a stout spine with a cilium close on each side of it. The inner part of the apical border is rounded. On each side nearly on a level with the top of the cleft is a feathered cilium, and two spines on the margin lower down.

Length.—The specimen, without the antennæ, was nearly half an inch long.

Locality.—Station 162, off East Moncœur Island, April 2, 1874; lat. 39° 10′ 30″ S., long. 146° 37′ 0″ E.; depth, 38 fathoms; bottom, sand and shells. One specimen. Dredged.

Remarks.—There is much agreement between this species and *Hippomedon kerguelensi*, Miers. To call attention to this, and at the same time to show respect to the clever naturalist who first described the species just mentioned, I have named the present species *Hippomedon miersi*. It possesses that character of the antennæ which Boeck makes generic, but which is perhaps peculiar to the male. It has many sufficiently distinct features, in the first joint of the flagellum of the upper antennæ, the long third joint of the mandible palp, the first side-plate of the peræon, the third pleon-segment, the tips of the uropods, the broad termination of the telson, and other details.

Hippomedon geelongi, n. sp. (Pl. XI.).

The head narrow, much longer than the very short first peræon-segment, produced into pointed lateral lobes between the upper and lower antennæ. First segment of the pleon with the postero-lateral angles much, second with the same little, rounded; third with the same acute and bent upwards; the third segment the longest; the fourth segment with a dorsal depression.

No *eyes* were perceived.

Upper Antennæ.—First joint large and tumid, upper margin distally produced: the second joint almost embedded in the first; the second and third both short, narrowing as they approach the flagellum, of which the first joint is large and long, adorned with the usual brush; of the other joints only two remained, the second bearing a large calceolus, and a row of five cilia near it. The secondary flagellum consists of five joints, furnished with setæ.

Lower Antennæ.—Gland-cone rather prominent, third joint not long, still equalling in length the composite first and second; fourth joint thicker, but scarcely longer than fifth, both furred on the upper margin and carrying feathered cilia on the lower. Flagellum of thirty joints, each apparently except the last furnished with a calceolus and a row of cilia behind it. The calceoli seemed to be rather short-stalked and with the outer rims firmer than usual.

Mandibles.—The cutting edge not well observed, but probably in near agreement with that of *Hippomedon kergueleni*; the spine-row of three curved, rather short spines; the molar tubercle with the dentate crown oval; the palp set just over the front part of the molar tubercle, its second joint considerably longer than the third, slightly constricted below the middle, this being the place where the muscles in connection with the first joint end, and where those in connection with the third joint begin; nearer to the apex begins a row of fourteen spines, which increase successively in length as they approach the outer angle of the apex; the third joint is long, slightly curved, narrowing distally, with two long setæ near the beginning of the outer border, and twenty-two pectinate spines along the concave edge; these slightly diminish in size as they approach the apex, till, close upon it, they rapidly increase.

Lower Lip.—The front lobes ciliated all round, apically as usual with more fulness; the mandibular processes narrow and not produced far back.

First Maxillæ.—The inner plate not very long, on the distal portion of its inner margin and the apex carrying a row of seven plumose setæ, graduated in size, the first of the row being very slight and the apical one very large; the proximal part of the margin is furred by the projection of the fine cilia on the surface of the plate; the outer plate carries distally eleven spines all strongly dentate, the six round the apical border very stout, the five below them on the surface of the plate more slender, not

in a parallel row; the second joint of the over-arching palp distally furnished with twelve teeth and a seta, in the maxilla examined.

Second Maxillæ.—The inner plate with almost its whole inner margin fringed with plumose setiform spines; the outer plate over-topping the inner, its apical border fringed with pectinate spines; both plates furred with cilia.

Maxillipeds.—The inner plates scarcely reaching as far as the apex of the first joint of the palp, furnished with the usual setæ on the inner margin passing round to the outer apical corner, and three teeth on the apical margin; the outer plates reaching some way beyond the second joint of the palp, carrying ten teeth on the inner margin, slightly increasing in length to the apex; a few small spines within the border; the curved outer and apical margin clean. The first two joints of the palp equal; the third joint shorter; the finger much shorter than the third joint, with some cilia on the inner side near the nail.

First Gnathopods.—These approach closely to the form described for *Hippomedon kergueleni*. The hand and wrist are equal in length; the hand widens a little distally, and the finger closes very exactly over the sloping convex palm, which the tip of the finger conspicuously overlaps, without any distinct tooth on its inner side; the palm being defined by some slender spines. There is no sign here of any furring of the hinder border of the third and fourth joints as in the species just mentioned, and in some other respects, as the figures show, they are somewhat differently furnished. The margins only must be compared in the figures, as of the present species it is the inside, not, as usually, the outside of the hand that has been represented.

Second Gnathopods.—In general appearance these are scarcely distinguishable from those of *Hippomedon kergueleni;* distally the wrist is a little fulled out, with short, bent spines or scales on the breast, that is, the postero-distal portion.

First and Second Peræopods as in *Hippomedon kergueleni*, with the upper part of the side-plate of the second pair somewhat broader and less elongate.

Third Peræopods.—Branchial vesicle much folded. First joint narrowed distally, much more prominently spined on the front border than in the species above mentioned; fourth joint widest proximally, not ovate; fifth joint much longer than fourth, both armed with rows of long and short spines. Finger long and slender, a little curved at the tip, naked except for the dorsal cilium near the base.

Fourth Peræopods.—Branchial vesicle as usual much smaller than in the preceding pair, on one side of the specimen ending in a narrow sinuous sac, but on the other side more dilated. First joint a long oval, most of the upper half of the front margin free from spines; third joint but little dilated; rest of the limb missing.

Fifth Peræopods.—First joint longer and broader than in the preceding pair, front margin rather sinuous, the concavity about the middle, upper half with only two

or three very small spines, hind margin very, but not evenly convex, rather deeply serrate; third joint not dilated; rest of the limb missing.

Pleopods.—The round-headed coupling spines have from three to four retroverted teeth; the rami have each from nineteen to twenty joints carrying densely plumose setæ; the first joints vary in the different pairs, being longer in the first pair than in the second, and in the second than in the third; the first joint has in the first pair thirteen or fourteen plumose setæ on one margin and four on the other, but fewer in the following pairs; the first joint of the inner ramus in the first pair has six cleft spines, in the second pair, I believe, only five, and in the third pair only three. The number of these spines, therefore, will not be of service as a specific character, unless all three pairs of pleopods are carefully scrutinized.

Uropods.—The peduncle in the first pair longer than the slender rami, of which the outer is but slightly longer than the inner; peduncle in the second pair equal in length to the rami, which are equal to one another, shorter than those of the preceding pair; peduncle in the third pair much shorter than rami; outer ramus with a nail, spines on or near the outer border, plumose setæ on more than half the inner border as far as the nail; inner ramus slightly shorter than outer, with spines on both borders, and plumose setæ all along the inner border.

Telson reaching beyond the peduncle of the third uropods; cleft for two-thirds or more of its length, the plates a little dehiscent distally, the apex of each rather more produced on the outer than the inner side of the terminal spine cavity; on each border two spines and between them a small feathered spiny seta.

Length.—The specimen measured, without the antennæ, nearly half an inch.

Locality.—Station 161, off Melbourne, April 1, 1874; depth, 33 fathoms: bottom, sand. One specimen. Trawled.

Remarks.—The specific name refers to Geelong, near the Station at which this species was captured.

I was tempted, chiefly on account of the mouth-organs, to refer this species to a new genus intermediate between *Callisoma* and *Hippomedon*. The mandibular palp agrees with that of *Callisoma crenatum*, Spence Bate, in its shape, but in its position with that in the species of *Hippomedon*. The inner plates of the second pair of maxillæ agree in their armature with *Callisoma* and not with *Hippomedon*, those of the first pair also disagreeing with *Hippomedon* as described by Boeck. The palps of the maxillipeds, the antennæ, the third uropods and telson nearly resemble the corresponding parts of *Callisoma crenatum*, while the gnathopods and other features are in closer agreement with *Hippomedon kergueleni*. However, on examining dissections of a specimen of *Hippomedon abyssi* (Goës), kindly lent me by Canon Norman, I found that the inner plate of the first maxilla had, like the present species, more than two

setæ, in agreement with the figure given by Goës himself. It seemed on the whole, therefore, better to widen Boeck's definition of *Hippomedon* than to add to genera already, as many authors think, too numerous.

Genus *Cheirimedon*, n. gen.

Epistome with an ascending lobe.

Mandibles with the palp set far forward, just over the molar tubercle, the third joint a little shorter than the second; molar tubercle prominent.

First Maxillæ with the inner plate carrying two plumose setæ; the palp not dilated, with several teeth on the apical border.

Second Maxillæ with the outer plate rather longer than the inner, neither of the plates armed far down the inner margin.

Maxillipeds with the palp having none of its joints elongate, fourth joint unguiform; inner plate reaching as far as the apex of the first, outer as far as the apex of the second, joint of the palp; outer plate with well-developed teeth, two at the apex spiniform.

Lower Antennæ with the peduncle elongate, fourth and fifth joints subequal.

First Gnathopods with the wrist very short, hand large, distally dilated, subcheliform.

Body with the postero-lateral angles of third pleon-segment sharply upturned.

Telson cleft.

The generic name *Cheirimedon*, χείρ, the hand, and μέδων, a lord, alludes to the importance in this genus of the hand of the first gnathopods. As usual, when a genus is founded for a single species, the characters should be regarded as preliminary and liable to modification, should other closely related species be subsequently found which could be included by small changes in the original definition of the genus.

Cheirimedon crenatipalmatus, n. sp. (Pl. XII.).

Head with a small rostrum and sharply produced lateral lobes; first two segments of the peræon short, third pleon-segment longer than any other of the segments, its postero-lateral angles sharp, greatly upturned towards the downward bending dorsal margin, the hind margin thus forming a deep cavity; the fourth pleon-segment with a deep dorsal depression, the dorsal margin acutely prolonged backwards.

Eyes not perceived, yet not certainly altogether absent.

Upper Antennæ.—First joint long, cylindrical; second and third short, narrowing distally; flagellum of twelve joints, of which the first is very long, equalling seven or eight of the following joints combined, cylindrical, slightly tapering, with only one or two filamentary cylinders in our specimen, but an appearance as if a narrow brush of them

might have been present originally; the remaining joints short, successively diminishing in length and thickness, many of them carrying long filamentary cylinders; the secondary flagellum of three slender joints, two long and one very short, the three together not equal in length to the first of the primary.

Lower Antennæ.—The gland-cone prominent, the third joint not much shorter than the composite first and second, the fourth and fifth long, straight, parallel-sided, the fourth rather wider than the fifth, equal to it in length, and also equal in length to the first four joints of the seven-jointed flagellum.

Triturating Organ.—In the Lysianassidæ this organ differs much from the form presented in the Orchestidæ. In the present species the oval organ exhibits round one margin a row of some two dozen spines, of which the basal half is thick, the other half becoming abruptly thinner and curved; round the opposite margin is a still more closely set row of some twenty-eight longer spines, nearly straight, pretty evenly thick all along to the end, which is cut into a short fork; where the two rows meet at the outer extremity of the organ there are some ciliated spines.

Mandibles.—Cutting edge smoothly convex, with an upper tooth turned a little downwards and a lower one turned a little upwards;[1] secondary plate on the left mandible small, strap-shaped, its edge cut into four or five teeth; spine-row consisting of three slightly curved spines (only two present on the right mandible); molar tubercle prominent, its oval crown somewhat ciliated on the edges, carrying four or five teeth down the centre, the remainder divided into rows of very minute denticles; the palp set far forward just over the molar tubercle, the first joint short, the next rather long, with eight or nine spines near the apex; the third joint shorter than the second by about the length of the first. The pectinate spines on the inner margin of the third joint, beginning below the middle, increase in length to the apex; they numbered seventeen on the left, fourteen on the right mandible.

Lower Lip.—With the forward lobes broad, pretty strongly ciliated.

First Maxillæ.—Inner plate small, oval, with two plumose setæ at the apex, the inner being the smaller; outer plate large, the apical margin with six strong dentate spines, below which are five others, the outermost strong, little dentate, the others a little more slender, not much curved, each with four or five lateral teeth; the palp reaching beyond the outer plate, its second joint nearly parallel-sided, the apical margin carrying from nine (on the right maxilla) to twelve teeth (on the left maxilla), the outermost longest, and one pectinate seta on the surface not far from the outer tooth.

Second Maxillæ.—The outer plate broader than the inner and prolonged a little beyond it; on the apex and a short way down the inner margin of the inner plate

[1] The true shape of this part of the mandibles was not clearly made out till after the figures, Pl. XII. *m. m.*, had been lithographed.

are about a dozen spines, followed below by half-a-dozen plumose setæ; the apical border of the outer plate set with spines curved at the tips, the longest at the outer apex, followed by two or three short ones down the outer margin.

Maxillipeds.—The inner plates reaching about as far as the apex of the first joint of the palp, with three teeth on the apical margin, of which the outer is much the smallest, and plumose setæ on the inner margin passing over to the outer apex; outer plates reaching slightly beyond the second joint of the palp, the inner margin set with teeth numbering from nine to ten, followed by two longer ones on the apical margin; eight or nine small spines may be seen on the outer surface of the plate, at a little distance from the inner margin; the palp compact, the second joint but little longer than the first; the third joint not longer than the finger, which is robust, ending in a long, thin, sharp nail; it has two cilia on the inner margin near the nail, and the dorsal cilium not far from the base.

First Gnathopods.—Side-plates a little widened and much rounded below; first joint projecting a little beyond the side-plate, of even width, with setæ on the front margin; second, third and fourth joints differing but little in length, together scarcely as long as the hand, the third oblong, the fourth triangular; the hand large, increasing in width distally, the palm a little sloping, defined by two spines, between which the finger-nail closes down, the palm-margin crenate, with cilia just within the border and setæ a little deeper within it; the finger has a dorsal cilium near the hinge, and one at the base of the nail, which in our specimen was broken.

Second Gnathopods.—The side-plates narrow, slightly rounded below and scarcely at all dilated; the branchial vesicles broad except at the base, without folds. First joint a little dilated and bent below, nearly equal in length to the third, fourth and fifth united; the second joint nearly as long as the wrist; the third joint much shorter, equal in length to the hand, furred behind, with some small setæ near the apex; the wrist lightly furred on the distal half of the front and the proximal half of the hind margin, below this on the dilated breast having tooth-like cilia or little incurved spinules, and, in addition, numerous scale-like ornaments, not, I believe, uncommon in this family, minute in size, fan-like in appearance; the hand is furred, a quadrangular oval, the lower part of the front and forepart of the apical margin occupied with the usual rows of pectinate spines, the small finger being set on beyond these, and antagonizing with the well-advanced point of the hinder margin of the hand, which is thickly set with pectinate, geniculate spines. The dorsal cilium of the finger fixed about centrally, projects over the tip of the finger.

First Peræopods.—Side-plates a little dilated below, scarcely rounded; first joint just reaching the lower rim of the side-plate; third joint much longer than fourth, rather broader, scarcely produced; fourth joint broader than fifth, but a little shorter: fifth joint with the hinder margin straight, with some spines; the hind margins of the

second, third, fourth and fifth joints all carrying setæ; the finger long and slender, almost straight.

Second Peræopods.—The side-plates with the excavation of the hind border unusually shallow, the lower part of the border showing a serration of three or four teeth; the branchial vesicle contracted a little below, very broad centrally. The joints of the limb almost precisely as in the preceding pair, the fifth joint a little shorter.

Third Peræopods.—Breadth and greatest depth of the side-plates about equal, the anterior lobe produced a little lower than the posterior; the first joint much longer than broad, its length surpassing that of the next four joints combined, broader above than below, spined along the front margin, the hinder serrate; the second joint has setæ on the front margin and some minute apical spines; the third joint dilated and outdrawn behind, has setæ and small spines on the front, spine-like setæ on the hind margin; the fourth joint scarcely equal in length to the third or the fifth joint and intermediate in thickness, has on its front margin long, single spines set between pairs of very small ones; the fifth joint narrows distally, its spine-groups, except the lowest, consisting of a long and a short spine side by side; the finger is much shorter than in the preceding pair.

Fourth Peræopods.—First joint longer and broader than in the preceding pair, but not as long as the four next joints of the limb, very slightly narrowed below; front margin spined and ciliate, hind margin serrate; the third joint little expanded or produced, about equal in length to the fifth; the fourth a little shorter than the third; the fifth narrow, narrowest distally; small spines on the front margins of all these joints, long ones also on the fourth and fifth, and setæ on the second and third; the finger thin and short.

Fifth Peræopods.—First joint longer and broader than in the preceding pair; hind border much more convex than in the two preceding pairs, but, as in them, deeply serrate, the upper part of the front border free from spines; the third joint shorter than the fourth, and the fourth than the fifth; the finger small; the armature of the joints similar in character to that of the preceding pair.

Pleopods.—The pair of coupling spines on each peduncle have two backward-directed hooks on each spine; the joints of the rami appear to vary in number from ten to twelve for the inner branch, and from twelve to thirteen for the outer; the cleft spines form a row of five on the first pair, of three on the second and third pairs.

Uropods.—The peduncles of the first pair are longer than the slender, almost straight rami; the outer ramus longer than the inner, the margin spines few, none of them near the sharp apex, which is formed by a minute nail with a cilium at its base on the lower margin; peduncles of the second pair subequal to the rami, which are more stoutly spined than those of the preceding pair, the outer ramus but little longer than the inner; peduncles of the third pair short, shorter than the outer, longer than the inner,

ramus; the outer ramus broadly lanceolate, with spines on one margin, and ending with a decided nail; the small branch ending acutely, without a nail, a slender spine on one margin near the apex, and some way above it a cilium; higher upon the other margin another cilium.

Telson projecting beyond the peduncles of the third uropods, cleft for more than three-quarters of its length, narrowing distally, where it becomes slightly dehiscent by the curving round of the margins of the cleft; the inner part of each apex a little more produced than the outer, and in the hollow a stout spine inserted with a cilium by its side. Near each outer margin, a little below the top of the cleft, the telson has a spine on the surface, and below this one or two feathered cilia, and here and there a simple cilium.

Length.—The specimen, in the position figured, measured three-tenths of an inch.

Locality.—Station 149H, off Cumberland Bay, Kerguelen, January 29, 1874; depth, 127 fathoms; bottom, volcanic mud. One specimen, female.

Remarks.—The specific name, *crenatipalmatus*, refers to the palm of the first gnathopods.

The only other species in this group which has a form of hand similar to that of our species is, so far as I know, *Normania latimana*, G. O. Sars, but that species has been only provisionally assigned to Boeck's genus *Normania*, with which, as defined by its author, neither that species nor this agrees. The mouth-organs of *Normania latimana* have not yet been described, so that I cannot say whether it belongs or not to the genus now instituted.

Genus *Platamon*, n. gen.

Mandibles with the palp set forward over the dentate crown of the molar tubercle.

First Maxillæ with the inner plate oval, carrying two plumose setæ, the second joint of the palp greatly expanded, with numerous teeth on the apical border.

Second Maxillæ with the inner plate broader than the outer, its inner border fringed as well as the apical.

Maxillipeds with the inner plates remarkably broad, the outer plates with numerous teeth on the inner border, and two closely adjacent to the rest on the apex.

Both pairs of *Gnathopods* long and slender, with the fingers well-developed, the hand in the first gnathopods shorter than the wrist, oval, subchelate.

Third Uropods with the rami as long as those of the second.

Telson divided beyond the centre, extending beyond the peduncles of the third uropods.

The generic name is derived from the Greek word πλαταμών, a broad space, in allusion to the great breadth of the parts of the maxillæ and maxillipeds above described.

Remarks.—There seem to be many points of affinity between this genus and the genus *Glycerina* of Haswell. Of the type species, *Glycerina tenuicornis*, Mr. Haswell very kindly sent me a specimen, but the bottle containing it being broken in transit, the specimen was dry when it came to hand, and therefore not well fitted for the observance of minute details. Mr. Haswell states that there is no accessory plate to the mandibles. On this I cannot pronounce any opinion from my own observation. I observed three strong spines in the spine-row, and on the long molar tubercles several (nine or ten) little bright spines of cylindrical appearance standing out, not closely set, surrounded by a fur of cilia; the spines of the first maxillæ run some distance down below the apical margin; the teeth on the apex of the palp are only seven or eight in number; the outer plates of the maxillipeds are feebly toothed; nor are other differences wanting.

Platamon longimanus, n. sp. (Pl. XIII.).

A small rostrum; lateral lobes of the head produced to a point, forming an equilateral triangle, dorsal line of the head longer than that of the first peræon-segment; postero-lateral angles in the first segment of the pleon rounded, in the second rectangular, in the third acute and upturned; fourth segment with a dorsal depression, slightly carinate, pointed behind; the sixth segment with lateral ridges on the back, which converge towards the telson and diverge when they reach its base.

Eyes not observed.

Upper Antennæ.—First joint very broad, distally projecting over the two next joints, which are very short, the projection being (like the rest of the joint) dorsally sharp, apically rounded; the flagellum of seven joints, the first tapering, equalling in length the other six united, the cylindrical setæ short, in some thirty rows; a long spine is placed at the distal end of the first joint, a shorter one on the second; the secondary flagellum slender, of three joints, together nearly equal in length to the first of the primary flagellum, the first a little curved, longer than the other two combined.

Lower Antennæ.—First joint not greatly dilated, gland-cone of the second joint long and narrow, third joint short, fourth and fifth joints long, subequal, the fifth the narrower and rather the longer; flagellum (on one of the antennæ) of thirty-five joints.

Triturating Organs of the stomach present a double very sinuous row of short, somewhat curved spines on one edge, on the other a projecting row of seta-like spines, set as the ornamental pipes of an organ-front often are, with the longest in the middle, those on either side gradually decreasing in size.

Mandibles.—Cutting edge convex, bent out of shape in the specimen examined, but seemingly with the usual denticle-like prominence above, and the lower apex not divided; secondary plate of left mandible strap-shaped, rather long, ending acutely, with two teeth above the apex; spine-row not made out; dentate crown of molar tubercle very

prominent; palp long, set just over the molar tubercle, both being far forward, first joint of palp short, second with a row of eighteen spines on the upper part; the third joint widening a little from the base, then narrowing almost to a point, carrying a row of thirty spines on the inner border; none were present on the outer border.

Lower Lip with the distal part of the forward lobes strongly furred, the lobes seemingly dehiscent.

First Maxillæ.—Inner plate oval, rather broad, with two unequal plumose setæ on the rounded apex; outer plate broad, not greatly elongated beyond the inner, apical margin not confluent with the inner margin; all the spines and their denticles of stout structures, but especially the five or six of the upper row; the palp with its second joint remarkably dilated, both lateral margins convex but the outer much more than the inner, the very broad apical margin set with nineteen spine-teeth, of which the outer two are excavate on the outer side; they are followed by a straight pectinate spine at the outer corner, and a similar one is found at about the centre of the row of teeth but a little below it.

Second Maxillæ.—Inner plate shorter than outer, the lower part very broad, distally narrowing, its sinuous inner margin set with fifteen plumose setæ, the apical margin set with rows of spines of different sizes, the smaller seemingly smooth, the larger pectinate, the stoutest of these being at the inner angle near to the setæ; the outer plate less broad than inner, the outer margin so much folded over that it cannot be flattened out in mounting for the microscope without separating it from its shaft, the apex rather more oblique than that of the inner plate, set closely with rows of pectinate spines.

Maxillipeds.—The inner plates of very unusual breadth, projecting rather in advance of the first joint of the palp, the plumose setæ of the inner border being comparatively short, numbering fourteen actually on the margin, the row being continued by shorter ones passing over towards the outer apex; the apical margin carrying three pointed teeth followed by a row of several pectinate spines; the outer plates long, reaching beyond the second joint of the palp, the straight inner margin smooth for some distance from its base, then presenting a spine, at a short interval from which begins a close-set series of eighteen sharp teeth, succeeded at the apex by a nineteenth tooth and a curved spine; on the surface within the margin are eight small slender spines; the second joint of the palp is longer than the first; the finger is as long as the third joint; its inner margin is pectinate, the short sharp nail accompanied by some short cilia; the dorsal cilium much nearer to the base of the finger than to the nail. In position these maxillipeds are by no means broadly flattened out, as represented in the Plate for the sake of showing the details;[1] the two halves fold boatwise upwards, when *in situ;* in the

[1] In regard to all the Plates it will be understood that figures intended to give the minute details are drawn from dissections laid out as flat as possible with a view to examination under the microscope; in regard to the figures of this species that circumstance requires more than usually to be borne in mind.

figure it should be noticed that the inner plates are not flattened out to their full extent, the outer part being folded back against the outer plate; similarly it should be noticed that there is a folding over of the outer edges of the second and third joints of the palp. The dilated palp of the first maxillæ, likewise, when *in situ*, was far from being in the same plane with the rest of the maxilla.

First Gnathopods.—Side-plates more than twice as long as broad, with a convex front margin projecting over the base of the lower antennæ, hind margin nearly straight. First joint equal in length to the three following united, projecting considerably beyond the side-plate, a little expanded below, with some seven setæ on the front margin; second joint shorter than third; third nearly equal in length to the hand; wrist longer than the hand, like the third joint having setæ on the hind margin; hand long-oval, with setæ in various parts, especially several groups on the hind margin, the lower half of which is marked off as a palm rather by its pair of spines than by any break in the convexity; the spines are of unequal length, the palm-margin is ornamented by being cut into a series of sharp straight denticles, below which are small cilia; the finger is curved to fit the palm; it has a dorsal cilium near the base, and the tip of the finger appears as if formed of two plates laid one upon the other, as though the finger itself ran out to a point, and had a small triangular process (the nail) laid within the point.

Second Gnathopods.—Side-plates similar to those of the preceding pair, the hind margin rather less, and the front rather more, convex; first joint as long as the three following united, a little expanded and bent below, numerous setæ on the front margin; second joint much longer than third, smooth; third joint furred behind, with a few spines on the squared apex; the wrist longer than the second joint, very much furred behind and before, with spines on both the somewhat sloping sides of its apex; hand subequal in length to the third joint, narrow at base, but immediately expanding, widest at the palm, hind margin straight, front very convex, much furred on both sides, pectinate spines near the outer angle of the palm and round the hinge of the finger, the palm concave, not a thin edge but broad and set through most of its course with several rows of short sharp teeth, its sides also fringed with cilia and rows of pectinate spines, the pectinate spines having a short terminal piece abruptly narrower than the shaft, with a shorter accessory thread by its side; the finger is sickle-shaped, the much-curved inner margin being hairy, with cilia near the origin of the finger. The finger here is as strong as that in *Euonyx chelatus*, Norman.

First Peræopods.—Side-plates larger than those of the preceding segment, hind margin straight, front but little curved. Marsupial plates long, slender, the setæ extending along most of the front border. Branchial vesicles without folds, from a narrow neck expanding at once greatly for some distance, and then very much more to the long almost straight distal margin. The first joint of the limb broad, extending a little beyond the side-plate, with some setæ on the front margin; second joint short,

third broad, rather longer than either of the next following, with setiform spines on the front apex and the hind margin; fourth joint similarly armed, much broader than the fifth joint, which is subequal in length to it and similarly armed, gently curved, attached to the fourth joint at the anterior part of the distal margin; finger as long as the fifth joint, slender, curved slightly, and unarmed except for a minute dorsal cilium near the hinge, and a cap to the nail, the cap being a little broader than the nail and projecting slightly beyond it. In the figures *gn.*1. and *prp.*1. the nail is not shown.

Second Peræopods.—Side-plates not of any unusual breadth below, the greatest breadth being where the excavation ends about the middle of the plate, giving the appearance of an upturned point; the limb closely resembles that of the first peræopods.

Third Peræopods.—Side-plates rather small, broader than deep, neither lobe produced noticeably below the other. Branchial vesicles not reaching the dimensions of those of the first peræopods, broad above, narrow below, with a long and very narrow accessory lobe and a short one. First joint ovoid, much broader above than below, front margin with small spines, hinder with slight serrations, a lobe ascending at the top in front, another descending behind; third joint broader but considerably shorter than fourth, little decurrent, with spines on the front margin, and three on the hind margin, two high up and one apical; fourth joint broader than fifth but scarcely so long, with five groups of spines on the front margin, the apical group containing five spines of different lengths; on the front margin of the fifth joint there are six or seven groups of spines; the finger is long, very slender, shorter than the hand; the nail minute.

Fourth Peræopods.—Side-plates not much smaller than the preceding pair. Branchial vesicle with what appears to be an irregularly branched accessory lobe. First joint narrower than in the preceding pair, scarcely wider above than below; all the joints except the finger longer than in the preceding pair, but otherwise very similar.

Fifth Peræopods.—First joint large and long, of even breadth for some way down, the hind margin then rather abruptly sloping forward, little serrate, the front margin sinuous, little spined except at the lower part; the third joint narrower than in the two preceding pairs, the three spines on its hind margin much stronger; the fourth and fifth joints shorter and narrower than in the preceding pair, each with a spine at the middle of the hind margin, which is not found in either of the preceding pairs; the armature otherwise similar; finger very slender.

Pleopods.—The two coupling spines on the peduncles have three retroverted teeth; the cleft spines on the inner ramus numbering seven in the first pair, six in the other two pairs; joints of the rami twenty-eight to thirty, the first joint of the inner ramus longer than that of the outer.

Uropods.—Peduncles of the first pair subequal in length to the rami, a little longer than the inner, a little shorter than the outer, strongly spined on the upper margin;

rami long and slender, slightly spined, and only on the proximal part; peduncles of the second pair shorter than the rami; outer ramus longer than the inner, both shorter than those of the preceding pair; peduncles of the third pair much shorter than the rami, with groups of spines at the apical points, the rami about equal in length to one another, and to the longer of the second pair, the outer and under one forming a kind of neck at the base, with its sides unarmed to below the centre, then with five small spines on the inner, and four on the outer convex margin, ending with a decided nail; the upper and inner ramus broadest close to its base, and here on the inner margin with three spines, then a long interval followed by three more leading to the apex; on the outer margin five unevenly spaced, three small ones at intervals on the surface.

Telson reaching beyond the peduncles of the third uropods, much wider at the base than below, cleft for two-fifths of its length, the whole cleft more or less dehiscent, a spine in the notch of each narrow apex; several marginal spines, seemingly not quite symmetrically placed.

Length of the specimen from the rostrum to the back of the second pleon-segment, in the position figured, three-fifths of an inch.

Locality.—Station I., off Cape Finisterre, December 30, 1872; lat. 41° 58′ N., long. 9° 42′ W.; depth, 1125 fathoms; bottom, blue mud. Dredged. The specimen when it came into my hands was already broken into two portions. There was also the front portion of a second specimen.

Remark.—The specific name *longimanus*, long in the arm, refers to the unusual length of the first gnathopods. In view of the peculiarities of the species, it is of interest to note the great depth recorded for its habitat.

Genus *Onesimoides*, n. gen.

Mandibles with the palp set just over the dentate crown of the molar tubercle.

First Maxillæ with the inner plate carrying two unequal plumose setæ; the second joint of the palp not dilated, with more than six spine-teeth on the apical margin.

Second Maxillæ with the plates of nearly equal length, the outer rather the broader; the oblique apical margins, but not the inner ones, fringed.

Maxillipeds with the outer plates reaching about as far as the apex of the second joint of the palp, nodulous teeth numerous on the inner margin, one spine-tooth on the apex.

Upper Antennæ with the first joint of the primary flagellum long, that of the secondary equally long, spreading its wing (a thin laminar dilatation) over the other.

Lower Antennæ with the third joint short, the fourth and fifth subequal in length.

The side-plates of the peræon not projecting over the mouth-organs and base of lower antennæ.

First Gnathopods with a short triangular wrist, a very robust oblong hand, with the palm at right angles; subchelate.

Second Gnathopods weak, feebly chelate.

Peræopods all with the nail very short; peræopods of the last three pairs short, the first joint of the last pair greatly dilated.

Uropods short, successively decreasing, inner ramus of the last pair almost rudimentary.

Telson short, broad, entire.

Remarks.—The generic name is chosen to call attention to the relationship between this genus and *Onesimus*, Boeck. In assigning only "5–6" spines to the apex of the palp of the first maxillæ Boeck unduly limits the number, as there are more in *Onesimus edwardsii* (Kroyer).

Onesimoides carinatus, n. sp. (Pl. XIV.).

Rostrum rudimentary, lateral lobes of the head produced not far in a rounded angle; a carina scarcely perceptible on the first five peræon-segments, well-marked on the sixth and seventh of the peræon and the first four of the pleon; the fourth segment of the pleon with a dorsal depression, the sixth outdrawn on either side of the telson; all parts furred with short hairs; a slight dorsal depression on the segments from the fourth of the peræon to the third of the pleon gives a crenate appearance to the dorsal outline; the postero-lateral angles of the third pleon-segment are right angles.

Eyes not made out.

Upper Antennæ.—First joint of the peduncle much longer than broad, with a dorsal depression near the base, and many minute feathered cilia along the upper margin; second and third joints short; flagellum of twelve joints, the first nearly as long as the first of the peduncle or as five of the following joints of the flagellum; this joint tapers distally, and so does the flagellum as a whole, although all its joints except the first and last widen a little distally; the secondary flagellum of four joints, of which the last minute, the first as long as the first of the primary, close to which it lies, spreading out a broad thin membrane over the numerous rows of slender cylinders which form the brush; on the under side of this shield are five or six sets of cilia singly or in groups.

Lower Antennæ quite free from the side-plates of the peræon; rather shorter than the upper antennæ; the first joint not greatly expanded, partly covered by the projecting lobe at the lower front angle of the head; gland-cone very prominent; third joint short; fourth joint a little expanded distally, rather longer than the fifth, nearly as long as the first joint of the upper flagellum; flagellum of nine joints.

Lower lobe of the epistome projecting a little in front of the upper lip.

Mandibles.—Cutting edge folded back in the specimen so that its contour could not

be exactly made out, seemingly of the usual form; secondary plate of left mandible very small, strap-shaped, curved, microscopically dentate at the apex; spine-row of three very small curved spines close together; molar tubercle prominent, the dentate crown showing some fourteen or fifteen transverse blades, and set round the edge with prominent teeth pointing in towards the blades; articular condyle large; the palp set just over the molar tubercle; some eighteen spines form a row on the upper part of the second joint; there are twenty-two spines on the inner border of the third joint, beginning below the middle, and one spine near the outer border and the base; the third and first joints together about equal the length of the second.

Lower Lip.—Forward lobes but little dehiscent distally, overlapping below when flattened, inner and apical margins ciliated, but not the outer margins; margins of the mandibular processes ciliated.

First Maxillæ.—Inner plate narrow at the apex, tipped with two plumose setæ; outer plate long, apical margin fringed with six strong dentate spines, with four, more slender, below them, and the eleventh, a strong one, standing a little apart from the rest on the inner margin; those in the left maxilla (figured on the right-hand side of the Plate), seem to have been much more worn than those in the companion maxilla, a rather odd circumstance; the first joint of the palp very short, the second long, of almost uniform width, in the left maxilla showing twelve spiniform teeth on the apex, while on the other maxilla there are only nine; in each there is also a plumose seta.

Second Maxillæ.—The plates slender, the outer broader, very little longer than the inner; the apical margins of both very oblique, the fringe of the inner plate being bounded by a plumose seta much longer than the adjacent spines.

Maxillipeds.—Inner plates with plumose setæ on the inner margin, nine in number, diminishing in size towards the apex, which they reach before the series is continued towards the outer corner by one or two additions; the apical margin has three teeth, the innermost the largest, below which is a smaller spine-tooth; on the outer side of the three is a curved spine; the plates themselves, though flat on the inner surface, on the outer are so strongly ridged as to be in fact longitudinally three-edged rather than laminar, answering to the epithet "prismatic" applied by Kroyer to the corresponding plates in his *Anonyx edwardsii;* they reach beyond the first joint of the palp; the outer plates reach as far as the apex of the second joint of the palp; on the inner margin are four long setæ among cilia followed by a long spine, and this by thirteen close-set nodulous teeth, the two uppermost and largest of which may be reckoned as apical; these are followed by a pectinate spine-tooth; on the outer surface away from the margin are seven spines of some length; of the palp the first joint is short, the second not very greatly longer; the finger is short, with a narrow nail set among cilia; the dorsal cilium is midway between the base of the finger and the base of the nail.

First Gnathopods.—Side-plates leaving the head and mouth-organs almost entirely

uncovered, broader above than below, the front margin concave, the lower part of the plate squared, with rounded angles. First joint of the limb extending much beyond the side-plate, narrowest near the base, then expanding to its greatest width and narrowing slightly to the end; second joint as long as the third, with some long setæ chiefly at the hinder distal end; the third joint distally rounded, its whole hinder margin densely clothed with long setæ; the wrist triangular, cup-shaped, scarcely longer than the preceding joint, broad distally, the free hind margin setose; the hand rather broader than the wrist and much longer, of equal width throughout, bearded on the hinder margin with setæ, which become shorter in proximity to the palm; the front margin with only a distal tuft; the palm at right angles to the hind margin, defined by two spines socketed deeply in the surface of the hand; a row of cilia on either side of the palm margin; the finger much curved, the tip of the nail fitting exactly to the end of the palm.

Second Gnathopods.—Side-plates oblong. Branchial vesicles elongate, the part that rises above the neck rounded, the central part the widest, the end narrowing almost to a point. The first joint of the limb extending beyond the side-plate, not so long as the branchial vesicle, straight, only slightly expanded below; second joint longer than third; third rounded below, minutely furred on the breast or hind margin, which also carries a few spines or setæ; the wrist at first a little narrowed, then gradually widening a little, longer than the hand, furred on the hind margin, carrying very few setæ; the hand oval, minutely furred and covered with small scales, carrying on the hind margin four groups of spines short but strongly pectinate on two edges, a larger group in several rows and of varied sizes on and near the front apex over-arching the minute finger, which is set in the middle of the apical margin and closes pretty tightly over the inward curving ciliated palm. In the figure, as in the specimen, the hand and wrist of this delicate and not very elongate limb are twisted round, and of the wrist it is not a lateral surface that is shown but rather the region of the anterior margin.

First Peræopods.—Side-plates similar to the preceding pair, rather broader. Branchial vesicles long, of nearly uniform breadth except at the neck. First joint of the limb scarcely reaching beyond the side-plate; third joint longer than fourth or fifth, scarcely decurrent, of almost uniform breadth, this and the other joints having setæ on the hinder margin; fourth joint rather thicker, barely shorter, than the fifth; fifth joint with six sets of spines as well as setæ on the hinder margin; finger very short and stumpy, inner margin furred like the preceding joints; a minute nail, abruptly narrower, set among cilia.

Second Peræopods.—Side-plates broadly oblong, excavate behind, the hinder margin forming a slightly outdrawn angle at the bottom of the excavation, lower margin ciliated; the joints of the limb in close agreement with those of the preceding pair.

Third Peræopods.—Side-plates rather broader than deep, front lobe descending a

little below the hinder. Branchial vesicle expanding greatly from a narrow neck, then with a broad triangle ending in a rounded point; close to the neck a small, narrow, accessory vesicle; first joint of the limb not so broad as the side-plate and not much longer, broader above than below, with setæ on the front margin, serrate on the hinder, with fine hairs on both; third joint short, expanded below, slightly decurrent behind, setæ on the front margin of this and the preceding joint, this with slender spines on the hind margin; fourth joint a little longer than the third, rather broader above than below, where it is twice the breadth of the fifth joint, the spines on both borders slender; fifth joint slightly longer than the fourth, the stoutest of its spines close to the hinge of the short, stumpy, curved finger; all the joints more or less furred.

Fourth Peræopods.—Side-plates produced downwards in a rounded lobe behind. Branchial vesicle oval, pointed below, shorter than the first joint. First joint a long squarish oval, with a few scattered spines above and setæ below on the front margin, serrate on the hind margin; third joint as in the preceding pair; the rest of the limb missing.

Fifth Peræopods.—Side-plates small; first joint greatly dilated, narrower above than below, front margin nearly straight, equalling the length of the third, fourth and fifth joints united, the serration on the lower margin behind directed to face the serration of the hinder margin; the third joint very short, scarcely either dilated or decurrent, with two spines on the lower part of the hinder margin; fourth joint longer as well as broader than the fifth, of almost even thickness throughout; fifth joint longer than the third; finger as in the preceding limbs.

Pleopods.—The coupling spines on the peduncles very small; the cleft spines on the inner ramus numbered five in the first and second pairs, four in the third pair, the spoon-shaped branch being nearly as long as the other; the joints of the rami numbered from eighteen to twenty-two; on the large first joint of the outer ramus of the first pair there were eighteen plumose setæ.

Uropods.—Peduncles of the first pair not much longer than the outer ramus; inner ramus with three spines on its upper margin, much shorter than the unspined outer ramus; second pair short and stout, peduncles longer than the subequal rami, which are slightly curved, sharply tipped, and carry some spines on their edges; peduncles of the third pair very short, a little longer than the outer ramus, which has a spine on the surface and one on either side of the nail; the inner branch very short and narrow, with a spine on the middle of its inner margin and one or two cilia near the apex, which descends but little below the spined apex of the peduncle.

Telson not extending beyond the peduncles of the third uropods, undivided, its breadth and length equal, narrowing but little distally, with eight cilia on the more or less rounded or squared distal border.

Length of the specimen, in the position figured, from the rostrum to the back of the second pleon-segment, two-fifths of an inch.

Locality.—Station 184, off the north-east coast of Australia, August 29, 1874; lat. 12° 8′ S., long. 145° 10′ E.; depth, 1400 fathoms; bottom, Globigerina ooze; bottom temperature, 36°. One specimen. Trawled.

Remarks.—By its carina, mouth-organs, short hinder peræopods and short uropods, this species seems connected with the *Lysianassa umbo* of Goës, but the antennæ, first gnathopods, and undivided telson again remove it from that connection. It also bears much resemblance to the genus *Onesimus* of Boeck, and in particular to *Anonyx edwardsii*, Kroyer, which Boeck assigns to *Onesimus*, but the differences are too numerous to admit of the present species being brought under the generic definition given by Boeck. For the definition of *Onesimus* or *Onisimus*, Boeck, see Note on Boeck, 1870 (p. 398).

The specific name speaks for itself.

Genus *Sophrosyne*, n. gen.

Mandibles with the palp set far forward, molar tubercle small or obsolete.

First Maxillæ with the inner plate small, the outer plate and the palp with the apical teeth few.

Maxillipeds with the inner and outer plates very small and the palp long.

First Gnathopods strong, especially the chelate hand.

The Uropods small, successively decreasing in size.

The Telson not projecting beyond the peduncles of the third uropods, more or less cleft.

The genus is strikingly distinguished by the feeble structure of the mouth-organs and of the after-part of the pleon in contrast with the powerful structure of much of the rest of the animal and of the first gnathopods in particular. In Boeck's definition of the Lysianassinæ it will be necessary to qualify the epithet "robusti" applied to the "Pedes maxillares" by the adverb plerumque, to enable the definition to include the present genus.

The generic name is derived from *σωφροσύνη*, temperance, voracity being probably precluded where the mouth-organs are so slightly framed.

Sophrosyne murrayi, n. sp. (Pl. XV.).

Head slightly produced in an obtuse angle between the upper antennæ; the lateral angles between the upper and lower antennæ rounded. Back rounded, third segment of the pleon with two latero-dorsal humps near the extremity, its postero-lateral angles produced into a sharp upward-turned process, so as to form part rather of the hinder than of the lower margin; fourth pleon-segment with a dorsal depression, abruptly

narrower across the back than the wide distally squared dorsum of the third segment; the first three segments of the pleon large, the remainder small, the contrast between the two portions when viewed from above being especially conspicuous.

Eyes not observed.

Upper Antennæ.—First joint of the peduncle shorter than the head, much longer than thick, upper margin convex, with a slight depression near the base; second joint longer than third, and longer than the first joint of the flagellum; flagellum of seven joints, the first equal in length to the two following, all the joints carrying filamentary cylinders; secondary flagellum of four joints, the first as long as the first of the primary, the other three shorter than the next three of the primary.

Lower Antennæ.—Gland-cone prominent; third joint not very short, fourth longer than fifth, widening distally, both fourth and fifth with some slender lateral spines; flagellum of eight articulations, of which the first is the longest, each with a distal tuft of cilia.

Mandibles.—The cutting edge very slightly convex, with the upper tooth sharply produced downwards and the lower tooth bifid, produced upwards and outwards, the secondary plate of the left mandible small, spiniform, placed low down; both spine-row and molar tubercle seemed to be wanting; the palp set far forward, the first joint short, the second with six or eight spines at the upper end, the third joint little shorter than the second, with six or seven spines at and near the upper end, and numerous adpressed cilia on the surface projecting beyond the inner margin. The figures in the Plate show the mandibles as they appear with their edges somewhat bent in; the enlarged figure of the left mandible shows the true outline of its cutting edge; that of the right mandible is probably similar, but it could not be made out with certainty.

First Maxillæ.—Inner plate very short, rounded at the top, carrying a single seta; outer plate showing a minute serration with four minute spine-teeth at the upper part of the inner margin, and apically two powerful bent teeth, the outer much the larger and over-arching the inner, but whether these two teeth consist of prominences surmounted by spines or constitute simple processes of the margin, could not be definitely made out; the second joint of the palp widens greatly from the base, and on the broad truncate apex carries four or five little spine-teeth, the outermost larger than the others; on the inner border it has four or five slender spines.

Second Maxillæ.—The outer plate seemingly much longer than the inner, with seven spines dispersed along the upper part of the inner margin and the apex; the inner plate, so far as made out, with few spines.

Maxillipeds extremely slender; inner plates minute, slender, not reaching even to the base of the first joint of the palp; the apical margin produced into a tooth-like point on the inner side, near the much lower outer side carrying a long spine, the only armature of the plate; the outer plates slender, reaching but little beyond the first joint

of the palp; on the inner and apical margin twelve spines may be counted, those lowest down being small, the four at the apex the largest, the outermost conspicuously exceeding all the rest; the first joint of the palp short, with one long pectinate spine on the inner, and one spine or seta on the outer, apex; the second joint larger than the outer plates, with several spines on the inner and apical margins; third joint longer than first; finger long, with a short nail, dorsum cilium near the base of the finger.

First Gnathopods.—Side-plates narrow at the base, very greatly dilated below, projecting over the base of the lower antennæ. First joint of the limb projecting little beyond the side-plate, very broad, dilating downwards, with setæ along the front margin; the second joint with several tufts of setæ or rather long pectinate spines on the hind margin; third joint a long triangle with the point downwards, with no free anterior margin; the wrist triangular, cup-shaped, behind carried out into a lobe flanked by the apical margin of the third joint and the hind margin of the hand, but with a narrow interval on each side; the hind margin of the third joint and of the lobe of the wrist just mentioned are armed with long geniculate pectinate spines, and also with rows of shorter, but strong and strongly pectinate spines, increasing in length distally; the powerful hand is longer than broad, widest at the palm, with convex front and concave hind margin, the latter set with six strong spines, increasing in length towards the palm, and with pectinate spines or setæ, such as occur also on various parts of the surface of the hand; the hind margin runs out into a long sharp tooth, the point of which contains at the back a small spine with accessory thread, just showing its tip beyond the point; the inward sloping palm is convex beyond the triangular apex, and is set with spinules, one stronger and blunter than the rest being close to the hinge of the finger; the finger itself overlaps the tip of the palm with its sharp nail, and seems to be without other armature than the minute dorsal cilium, and a sharp but short projection of its inner margin one-third of the distance between the hinge and the tip; on either side of this process is a cilia-like spine. The hand may be described as chelate.

Second Gnathopods.—Side-plates oblong in general character, less wide than the preceding pair. Branchial vesicles large, narrowed below. The limb weak, first joint slender, not projecting beyond the side-plate; second joint much longer than third, equal in length to the wrist, furred on the lower part of the hinder margin; third joint short, equal in length to the hand, furred on the hinder margin; the wrist strongly furred almost all over, carrying a few long spines distally; the hand expanding distally, widest at the palm, strongly furred, also with scales over the breast; the front margin further produced than the hinder, and occupied at the apex with the usual pectinate spines over-arching the small much-curved finger which is set close to this point; the concave palm is bordered with rather long cilia, and such also are found on the finger at some little distance from the nail; the palm being concave and the finger much bent; the latter will not be likely to close on the other without leaving a considerable cavity.

First Peræopods.—Side-plates similar to the preceding pair. Branchial vesicles very large. Marsupial plates narrow. First joint of the limb not reaching the lower rim of the side-plate, with some setæ on the hind margin, very long ones at the apex; third joint much longer and broader than the fourth, with long setiform spines at the decurrent apex in front, and, like the preceding and following joints, with many groups of them on the hinder margin; the fifth joint longer than the fourth, with a few groups of slender spines on the hinder margin, and some spinules on either side of the hinge joint of the long, slender finger.

Second Peræopods.—The side-plates very broad below, a little tooth at the hinder extremity of the lower margin, and one facing it not far from the front extremity of the same. The limb similar to that of the preceding pair.

Third Peræopods.—Side-plates with the front lobe descending below the hinder one. First joint broadly oval, strongly spined on the very convex front margin, the hind margin serrate, the lower margin smooth, rounded, descending below the back of the second joint; the third joint longer than the fourth, spined on both margins, inflated, decurrent; the fourth joint broader than the fifth, but scarcely so long, its lower margin on the outside flatly rounded, broad; all the five joints carrying spines and setiform spines on the front margin; the sixth joint or finger slender, unarmed.

Fourth Peræopods.—Branchial vesicles throwing out a narrow, accessory, sac-like process from the upper part of the hinder margin. The joints similar to those of the preceding pair, but broader and longer.

Fifth Peræopods.—The first joint longer and very much broader than in the preceding pair, very strongly spined on the front margin, more deeply serrate on the hinder, and with the lower margin behind somewhat squared, not reaching below the second joint; the third joint scarcely dilated, spined at the decurrent apex behind and just above the apex; the fourth joint narrower than the third, shorter than the fifth, the spines in front of these joints shorter and stronger than those of the preceding limbs.

Pleopods.—Coupling spines minute, with two retroverted teeth just below the apex on one edge and a backward serrature along the other edge; four cleft spines on the inner ramus of the first and second pairs; the joints of the rami from fourteen to sixteen in number.

Uropods.—Peduncles of the first pair strongly spined, considerably longer than the rami; outer ramus longer than inner, with five spines along the border, stopping some way short of the apex; inner ramus with three spines; peduncles of the second pair not reaching so far back as those of the first, a little longer than the rami; the rami subequal, short, with few spines remote from the apex; peduncles of the third pair shorter than the short stiliform rami; outer ramus rather longer than inner, both almost entirely unarmed.

Telson as broad as long, not reaching to the end of the peduncles of the third uropods, cleft for less than two-thirds of its length; a small lateral spine on each side level with the top of the somewhat dehiscent cleft, the apices rounded not quite smoothly, less produced on the outer than the inner side, and on the outer side showing a cavity as if for a spine, above which is a small cilium.

Length of the specimen from the forehead to the back of the third pleon-segment, in the position figured, just under half an inch.

Locality.—Off Christmas Harbour, Kerguelen. One specimen, female.

Remark.—This being one of the most interesting forms among the Amphipods brought home by the Challenger, I do myself the pleasure of naming it after Mr. John Murray, under whose skilful and energetic administration the scientific results of the expedition are being worked out.

Genus *Cyphocaris*, Lütken and Boeck.

From the account of this genus given by Boeck in 1870 (see Note on Boeck, 1870, p. 398) must be excluded the statements that the second gnathopods are destitute of a nail, and that the third and fourth side-plates are coalesced. They may or may not be characters of the type-species, but the two species here described are without these characters and yet beyond all question belong to the genus.

Cyphocaris micronyx, n. sp. (Pl. XVI.).

Head almost concealed in the over-arching first peræon-segment, the summit of the head when withdrawn from its shelter taking a frontal position, while the lateral margin excavated for the antennæ faces downwards; first peræon-segment rather sharply outdrawn in front, in one of the specimens, fig. A, forming a peak, and in this exceeding in length the three following segments combined, in the other specimen, fig. B, not quite equalling them; the fifth, sixth and seventh segments successively increasing in length; the first three segments of the pleon each subequal to the first of the peræon, exceeding it in fig. B, falling short of it in fig. A; the fourth segment with a deep dorsal depression near its origin; the fifth and sixth as long as the fourth and fifth of the peræon. The first three pleon-segments posteriorly squared below, with the angles of the second and third a little rounded, those of the first segment more decidedly.

Eyes doubtful.

Upper Antennæ.—First joint stout, longer than the two following together; second and third joints short, rather stout and tapering; flagellum of twenty-one joints, the first very long, tapering, with a large brush of long and broad filamentary cylinders in

numerous rows on the inner or under side, second joint with three terminal spines, one slight, another longer with an accessory thread, third very long, sharply pointed, the remaining joints small, with distal rows of small cilia, the joints becoming longer and more slender towards the end of the flagellum; secondary flagellum slender, scarcely exceeding in length the first joint of the primary, its first joint far the longest of the five which compose it; some small cilia and filamentary cylinders at the apices of the three terminal joints.

Lower Antennæ.—First, second and third joints very short, closely united: first rather prominently lobed, cone of second prominent, blunt, third triangular; fourth joint the longest, a little dilated proximally; fifth joint shorter and much thinner; flagellum of seventy-five articulations, becoming longer and very slender throughout the distal portion of the antennæ; like the last two joints of the peduncle they are slightly ciliated. As in *Onesimoides* and *Eurytenes*, the base of the antenna is uncovered.

Upper Lip with front edge a little in advance of that of the epistome, apex furred.

Mandibles.—Cutting edge smoothly convex, with a small tooth above and another below, which on the right mandible is so little prominent as to form rather a notch than a tooth; secondary plate on the left mandible small, distally widened, with dentate edge of six teeth; spine-row of five or six setæ; molar tubercle prominent, crown with numerous rows of denticles; palp very large, set just above the articular condyle that rises over the molar tubercle; first joint small, second of great size, central part protruding where the muscles from the first joint end, the muscles which run to the third joint being inserted very near the first joint and therefore overlapping the others; near the distal end of the second joint there is a close-set row of pectinate spines with curved tips, twelve in number; third joint powerful, subequal in length to the second, ciliated on the surface, spine-border nearly straight, having some thirty-five spines pectinate on two edges, and at its curved apex two setules; the opposite convex border naked; the pectination of the spines seems to take a new departure at about one-third of their length from the base, giving the spines a jointed or geniculate appearance.

Lower Lip ciliated round the edges of the front lobes, the cilia on the apex and inner border being stouter than the others.

First Maxillæ.—Inner plate bordered distally with seven plumose setæ; outer plate much ciliated, apical border with its eleven spines in two rows, one set slender, flexuous, multidentate, the other set straight, stouter, with fewer teeth; palp with second joint very broad, six spine-teeth on the apical margin minutely serrate on their outer edges, a row of cilia near the spines, a long plumose one and a longer smooth one at the outer corner.

Second Maxillæ.—Inner plate broader than outer, and much broader at base than apex. Plates subequal in length, much ciliated on the surface and edges; inner plate with seven plumose setæ along the inner margin, and a double row of pectinate spines about

the apex; outer plate with a double row of longer pectinate spines about its apical border, with some short setæ on the outer margin.

Maxillipeds.—Inner plates not extending equally far with the first joint of palp, bordered with long plumose setæ on the inner margin, these passing over into plumose spines on the squared apical margin which carries three broad teeth; outer plate with ten teeth along the serrate inner margin, a row of flexuous spines behind them on the outer surface, plumose setæ on the apical outer border, cilia round the remainder of the curved outer border and on the surface of the plate. The first joint of the palp the longest, reaching almost as far as the apex of the outer plate, so that the three remaining joints, which successively decrease a little in length, project very prominently. All the joints of the palp except the last are bordered on the inner side with plumose setæ; those which they carry on the outer distal corners seem to be smooth; the third and fourth joints are ciliated on the surfaces; the last has a single apical plumose seta and a smooth one on the convex outer border.

First Gnathopods.—Side-plate very small, rounded below; first joint longer than all the rest of the limb, hinder margin sinuous; third joint furred on the hinder margin, a group of slightly crooked spines near the apex; wrist furred behind, subequal in length to the hand, having on the hinder margin a row of spines pectinate on two edges; hand narrowed distally, the palm not very clearly defined, microscopically pectinate, set with various spines and setæ, a few of the latter occurring on the anterior borders and apices of both wrist and hand; finger microscopically pectinate on the inner margin, with a stumpy spine and some cilia near to the nail. Of the spines on the palm some are strong, smooth, curved at the tip, with the accessory thread near the end, others are slender and pectinate.

Second Gnathopods.—Side-plates small, oval, rather larger than those of the first segment; branchial vesicle at its base narrow, main lobe large, longer than the first joint of the leg; first joint as long as that of the first gnathopods, but much shorter than the rest of the leg; second joint much longer than the third, subequal in length to the wrist; wrist longer than hand, furred on both margins, on the hinder margin adorned in a remarkable manner with several rows of peculiar curved spines or setæ, of very various lengths, which thicken apically, there presenting something the appearance of the under side of a horse's hoof, a thin striated wing on each side leading up to this termination, the two transparent slightly overlapping ends producing the appearance mentioned; on the sides there are some pectinate pointed setæ; the oval hand is much furred behind and distally in front, the armature consisting of remarkable spines as on the wrist, and in addition rows of shorter spines bending in the opposite direction, that is, towards the finger, distally pectinate, an accessory thread extending beyond the apex; on both hand and wrist the spines are graduated in length, increasing as they advance distally, so that the tips form a regular curve; the setiform spines on the side and infero-anterior corner

of the hand have flexible ends. The minute finger ends in a kind of double nail, some minute teeth occupying the inner margin of the outer and longer division, the nail proper, which curves over towards the palm in the usual manner, while the smaller division, perhaps only a projection of the finger-margin, curves away from the palm; at the origin of the two is a long cilium.

First Peræopods.—Side-plates scarcely as large as those of preceding segment; branchial vesicle like that of the preceding limb, and both there and here attended by a very small oval plate, quite smooth, which seems to be an accessory vesicle; first joint of leg much shorter than in the two preceding pairs; third joint longer than fourth, subequal to fifth, bowed forwards; fourth joint slender, parallel-sided, four small spines on the back rim, the two longer ones faintly geniculate; the fifth joint much dilated distally, presenting a sort of palm with two strong teeth pointing towards the finger-hinge and beset with strong spines, a single and two pairs; these spines are straight, with tiny curved tips pointing in the same direction as the teeth on the palm, and with accessory threads springing from about the centre. The finger is powerful, about as long as the fourth joint, much curved, smooth edged, sharply pointed.

Second Peræopods.—Side-plates larger than the preceding three combined, narrow at the base, projecting far forward so as to cover a considerable piece of both the preceding side-plates, largely excavated behind for the great side-plate of the fifth segment; branchial vesicles like those already described; first joint of leg considerably longer than in the preceding pair, to which this pair is in other respects similar, except that the third, fourth and fifth joints, and especially the fourth, are more elongate.

Third Peræopods.—Side-plates very large, as broad as those of the fourth segment, and at the base very much broader, front lobe incised below, not much deeper than the hinder part, which has its lower margin straight; branchial vesicle with small accessory plate as in preceding segments; first joint inserted by a bent neck within the incised lobe of the side-plate, seven short spines along the front margin, the hinder part produced almost as far as the three following joints, the hind margin divided into eight very pronounced, sharp, downward-pointed teeth, and the inner margin of the process divided into seven of similar character, the apex of the process forming a sharp terminal tooth considerably larger than any of the lateral dentations. The second joint is small; the third, spined on both edges, longer than the fourth, but shorter than the fifth; the fourth spined in front, and slightly behind; the fifth similar in structure to the corresponding somewhat smaller joint of the preceding pair, with three pairs of spines at the palm; finger as in the preceding pair, not larger. The remarkable decurrent processes of the first joint do not show an absolute uniformity in the marginal incisures between the two members of the pair of limbs, a point deserving of attention in view of the manufacture of species based upon minute differences.

Fourth Peræopods.—Side-plates rather large, a little deeper behind than in front;

branchial vesicle more dilated above than below; first joint spined on front margin, hinder margin not much produced downwards, but cut like that of the preceding limb, forming eleven teeth, of which the first and last are the smallest, the last not reaching so far down as the last but one; the second joint and the finger as in the preceding limb; the third, fourth and fifth joints more elongate, spined on both margins; the fifth joint less expanded near the palm.

Fifth Peræopods.—Side-plates less deep than the preceding, but of equal breadth; branchial vesicles less elongated; first joint much more elongate, scarcely spined on front margin, narrowing below, not produced far downwards, but overlapping the very short second joint, the hind margin cut into fourteen teeth, the last two as in the preceding peræopods; the third joint stouter but shorter than the corresponding joint of the preceding pair and than the fourth joint of its own pair; the fourth joint long, a little shorter than the fifth; the whole limb very straight, ending in a long, slender, very slightly curved finger, sharply pointed, without any trace of nail, fringed on the anterior margin with a close-set row of microscopic spines bending downwards. On the third, fourth and fifth joints there are various groups of spines on both margins and at the lower angles, the hand and wrist being sharply indented on the front margin, the hand not having a palm as in the preceding peræopods, though its distal edge is cut into teeth, apparently all round, certainly behind.

Pleopods.—The peduncles of the three pairs, as is usually the case, decrease a little in length successively backwards; on the inside of the peduncle near the infero-anterior angle are three spines, one small and simple, the other two (the coupling spines) stout and large, having from four to six teeth on the distal half of the front margin pointed back towards the base of the spine, and about the middle of the other margin a single tooth directed forwards; the rami have the first joints not very elongate, followed by sixteen to eighteen short joints, all with the usual long plumose setæ; the first of the outer ramus has at its origin an irregularly shaped process seeming to serve the double object of interlocking it with the peduncle and with the other ramus, on the first joint of which there is a small corresponding process. On the inner side of the first joint of this inner ramus there is also a row of five cleft spines; they are thick at the base, plumose throughout their slightly sinuous length as far as the split termination, the inner portion of which is of a pointed spoon-shape, the outer and longer spiniform, with the inner edge denticulate. The cleft spines in most species are very similar to those here described, but the details are seldom so easily observed as in this species.

Uropods.—Peduncle of first pair longer than rami, some spines on the upper edges; rami slender, spined on the upper edges, outer ramus shorter than inner, both curving inwards at the tips, both with microscopic pectination on the upper border, the pectination being much stronger in the outer ramus; peduncle of second pair shorter and less stout than in the preceding pair, equal in length to the inner ramus; rami similar to those of the

preceding pair, a little less curved at the tips; third pair with short peduncles, rami long, broadly lanceolate; the outer with plumose setæ on the inner margin, a spine at each side of the base of the nail, which is pectinate on the inner side; the inner branch rather the longer, with spines and feathered setæ on both sides, inner margin pectinate, no nail.

Telson elongate, narrow, reaching far beyond the peduncles of the third uropods, slit nearly three-quarters of its length, not dehiscent except apically, the two halves in the specimen A not quite symmetrical, with three spines on one margin and only two on the other; each half is apically divided, the shorter tooth being on the outside; a spine is inserted in each cleft.

Length of specimen A, in curved position, half an inch; specimen B, in the same position, a little shorter. The details were figured from specimen A.

Locality.—Station 295, off the west coast of South America, November 5, 1875; lat. 38° 7′ S., long. 94° 4′ W.; depth, 1500 fathoms; bottom, Globigerina ooze; bottom temperature, 35°·3. Specimen A; taken in the tow-net at the trawl.

Station 335, near Tristan da Cunha, March 6, 1876; lat. 32° 24′ S., long. 13° 5′ W.; depth, 1425 fathoms; bottom, Pteropod ooze; bottom temperature, 37°. Specimen B; taken with the deep trawl. The specimen as mounted contains several Globigerinæ.

Remarks.—Between this species and the type species of the genus, *Cyphocaris anonyx*, Lütken, as described and figured by Boeck, there are numerous points of close resemblance. Lütken's species was named *anonyx* obviously on the ground that the second gnathopods were devoid of an unguis or finger. The present species is named *micronyx*, to point to the fact of the second gnathopods possessing a finger, though a minute one. At the same time it is possible that there is one also in the earlier species, which has been overlooked. Boeck, who gives as part of the generic character, "pedes 2di paris elongati, ungue destituti," only says in the specific account that the finger seems to be absent. In *Cyphocaris anonyx*, from Greenland, the third and fourth side-plates are said to be coalesced, which is not the case in our species, and the remark that, in the first and second peræopods, "the fifth joint is somewhat thicker towards the end, and is on the inner margin armed with some small spines," is all the notice taken of what, if the species be identical with ours, are the rather remarkable palms on these two and on the two following pairs of peræopods.

Cyphocaris challengeri, n. sp. (Pl. XVII.).

Head having a certain amount of play within the first peræon-segment, the top of the head directed forwards, its anterior margin a little sinuous; the first peræon-segment about equal to the third and fourth united, the second shortest of all; the first three of the pleon each longer than first of peræon; the fourth with a dorsal depression near the

origin, the fifth and sixth equal to the fifth and fourth of the peræon; the lower hinder angle rounded in the first segment, squared and minutely produced in the second and third segments, of the pleon.

Eyes, apparently none. Some pigment-flecks in the ocular region, probably having nothing to do with vision.

Upper Antennæ.—First joint short, tumid; second and third together subequal to first; flagellum of fifteen joints, first tapering, as long as the first of the peduncle, with a not very dense brush of cylinders, the second short, with a long, straight spine at its end, the following joints quite small, longer and very slender towards the end of the flagellum; secondary flagellum of three slender joints, together equalling the first four of the primary.

Lower Antennæ.—First three joints very small, the gland-cone not very prominent, third joint triangular, fourth joint the longest, but not long, dilated near the middle; fifth joint shorter and thinner, dilated distally; flagellum of about forty joints, the later ones becoming long and thin, the earlier being very short, except the first, which has the appearance of containing some ten or a dozen rings in preparation to become joints.

Mandibles almost exactly as in *Cyphocaris micronyx*, the trunk massive, the great palp fixed far forward over the prominent molar tubercle, the secondary plate on the left mandible having six teeth. The palps were destitute of spines, but probably only by accident, as the inner new growth showed traces of them.

Lower Lip, forward lobes rather broad.

First Maxillæ, not conspicuously different from those of *Cyphocaris micronyx*. The same remark applies to the *second maxillæ* and to the *maxillipeds*.

First Gnathopods.—Side-plates very small, rounded below; first joint longer than the rest of the leg, lower half a little dilated; second joint very small; third short, triangular; wrist a little furred behind, scarcely as long as the hand, but thicker where distally dilated; on the lower hinder angle three spines pectinate on two edges of the distal half; hand narrowing distally, almost all the hinder margin, including the palm, microscopically pectinate, most of the palm more finely than the rest of the margin; besides cilia and pectinate setules, there are on the palm margin three spines, one very slender marking the beginning of the palm, a second rather stouter, with an accessory thread, a third shorter, with the hind margin minutely pectinate; finger with inner edge denticulate, having a larger tooth and cilia some way short of the nail.

Second Gnathopods.—Side-plates very small, narrowed below; first joint shorter than that of first gnathopods, a little bent; second joint as long as the wrist; third joint short; wrist longer than hand, with some setiform spines near the lower hinder angle; hand narrowed distally, furred, set with some spines and cilia; finger small, with a process antagonistic to the over-arching nail, cilia being set in the cleft between the nail and the process.

First Peræopods.—Side-plates very small; first joint about as long as in the preceding pair; third and fourth joints subequal in length, third rather the stouter, with the front margin curved; fifth joint longer, but more slender than fourth, spines on these joints few and small; no dilated palm on the fifth joint, a pair of spines at its junction with the curved, pointed finger.

Second Peræopods.—Side-plates very narrow at base, curving forwards so as to hide much of the three preceding side-plates, almost the whole of that of the third segment, deeply excavated behind so as on the whole to have the shape of an irregular collar; the leg similar to the preceding.

Third Peræopods.—Side-plates large, broad at base, widened below; the first joint projecting from the anterior part of the side-plate and tending to bend back underneath it, its front margin then forming a great forward-projecting knee, while the hind margin is cut into seven sharp, decurrent teeth, and below these produced into an enormous process, sharply pointed, extending down almost to the base of the finger; the second joint is as usual very small, the third and fourth subequal in length; the fifth much longer than either, though shorter than the two combined; finger curved, equal in length to the third joint.

Fourth Peræopods.—Side-plates rather large, though much smaller than the preceding pair; the first joint with front margin almost smooth, and, except at the top, straight; the joint, wide at the base, narrows so much below as to become almost triangular; it is produced halfway down the third joint by the hinder margin, which is cut into fourteen teeth; the third joint stouter and a little shorter than the fourth, which bears similar relations to the fifth; spines on both margins of these joints; the finger somewhat longer than in the preceding pair.

Fifth Peræopods.—Side-plates rather smaller than the preceding pair, rather deeper behind than in front; first joint long, front margin straight, hind margin cut into twelve or thirteen teeth, which form a gentle curve overlapping the third joint, but not so far down as the middle of it; second joint very short; third a little dilated above, longer than the fourth, shorter than the fifth; spines on the borders of all three; finger short, but straight, sharply pointed.

Pleopods.—The stout coupling spines near the infero-anterior angle of the peduncle were seen, but whether their structure was precisely as in *Cyphocaris micronyx* could not be determined; the rami consist of some eight to ten joints; the cleft spines on the first joint of the inner ramus are three in number, increasing in size successively downwards.

Uropods similar to those of *Cyphocaris micronyx*, but the rami with fewer spines, the outer and inner of each pair nearly equal in length.

Telson similar to that of the preceding species, except that no spines were discerned upon it except one in each apical cleft.

Length of the specimen in its bent position about one-fifth of an inch.

Locality.—The label on the mounted specimen states that it was taken 400 miles north of the Sandwich Islands; probably near Station 256. One specimen.

Remarks.—The differences between this species taken in the North Pacific and its congener from the South Pacific and South Atlantic are obvious; the shape of the first segment of the peræon and its size in comparison with the head, the armature of the second gnathopods, the form of the fourth pair of side-plates, and, above all, the first joint in the third peræopods, afford clearly distinguishing marks. It will be noticed that it is in the smaller species that the third peræopod has its most striking development, precluding any probability that this species might be a younger stage of the other.

Genus *Cyclocaris*, n. gen.

Mandibles broad in front, molar tubercle not dentate, palp central.

First Maxillæ with the inner plate bearing more than two plumose setæ, spines of the outer plate slender, teeth of the palp few.

Second Maxillæ with the inner plate much shorter than outer, a large part of its inner margin fringed with setæ.

Maxillipeds with the inner and outer plates very broad, the outer with spaced denticles on the inner margin, spine-teeth and setæ round the apex and part of outer margin; these plates reaching as far as the apex of the second joint of the palp.

Upper Antennæ with the peduncle very short.

Lower Antennæ with the base not covered by the side-plates of the peræon.

Gnathopods very slender and very long.

Side-plates of the first two peræon-segments very small.

Third Uropods with long rami extending much beyond the other pairs.

Telson long, extending much beyond the peduncles of the third uropods, deeply cleft.

The generic name is derived from κύκλος, a circle, and κάρα, head, it seeming probable, from the structure of the side-plates, that the animal naturally coils itself into a circle, bending its head round to the protection of the side-plates of the third and fourth peræon-segments. The form of the name also points to the affinity between this genus and *Cyphocaris* of Lütken and Boeck.

Cyclocaris tahitensis, n. sp. (Pl. XVIII.).

Head short, lateral margin sinuous, bowed out between the upper and lower antennæ; the side-plates of the peræon not extended forward over the head or base of the lower antennæ; the last four segments of the peræon rather long; of the pleon-segments the postero-lateral angles of the first rounded, of the second acute, of the third blunt, lower

margins of second and third ciliated; the fourth segment with a dorsal depression, the sixth with lateral ridges on the back curving outwards at the telson. The specimen was coiled almost into a circle.

Eyes not made out with any certainty.

Upper Antennæ.—First joint tumid, very little longer than the second and third united, these being short and thick; flagellum of ten joints rapidly tapering, the first stout and large, subequal in length to the following nine together, the brush formed by some twenty-four rows of setæ; apically the first joint has a long slender spine, the following joint having two such, the third joint two and a smaller one, the fifth joint two of the smaller size, all the joints having spiniform cilia; the secondary flagellum of six joints, the first long, the six together as long as the first five of the primary; some spines at their distal ends.

Lower Antennæ.—First joint a little dilated below, the gland-cone small and little prominent, third joint quite short, fifth joint thinner and rather longer than fourth, neither very long, both ciliated on the upper margin; flagellum of twenty-five joints.

Upper Lip projecting a little in a convex lobe between the mandibles.

Mandibles broad in front, the cutting edge long, very convex in the right mandible, much less so in the left, having a prominent tooth at the top, angled below, with two teeth or serrations on the lower margin behind the angle; the secondary plate of the left mandible placed high up, very small, strap-shaped; spine-row of nine spines, below and behind which a space on the outer surface of the mandible is armed with prickles; molar tubercle seemingly weak, tongue-shaped, produced far backwards, slightly ciliated, not at all dentate (not shown in the figure); palp set some way back behind the spine-row; between the palp and the cutting edge the top border runs up into a great triangular lobe, with the small articular condyle rising just over its apex; the first joint of the palp very short; there are nine spines in the row at the upper part of the second joint; the third joint with the first equalling the length of the second, carrying fifteen spines on the inner border.

Lower Lip, the mandibular processes long and smooth, apically rounded.

First Maxillæ.—Inner plate bordered above with nine long plumose setæ; the outer plate much longer than the inner, with its eleven spines all slender and long, among cilia, two of them some way below the apex, those actually on the apex very elongate; the denticles of the spines not numerous, and not placed near the apices of the spines: the first joint of the palp very short, the second long, of tolerably even width, its apex cut into five teeth, of which the three central very prominent, surmounted by little spine-teeth, a little spine also in the cavity formed by the small inner tooth and a longer spine at the outer almost obsolete tooth; on the outer margin, some way below the apex, a long seta is inserted, and a shorter one near the tooth next but one to the outer margin.

Second Maxillæ.—Inner plate much shorter than the outer, bordered on the inner

margin with about a dozen long plumose setæ, and also with spines not reaching quite so far down the margin as the setæ; the outer plate bordered with spines on the upper half of its inner margin and on the apex.

Maxillipeds.—The inner plates not reaching as far as the apex of the first joint of the palp, widening distally, the outer margin very convex, the apical border very large, concave, produced at the outer corners; ten plumose setæ passing from the inner margin at once obliquely across to the outer apex; in the concavity of the apical border three little nodulous teeth at intervals, at the outer extremity three setæ, the longer innermost; just below the innermost nodule a longer spine-tooth is placed, as it were crossing swords with the corresponding tooth of the opposite plate; outer plates very broad and long, reaching as far forward as the second joint of the palp; on the inner border some thirteen denticles are spaced, on the apex three or four spines successively increase in size, and pass over into long feathered setæ which fringe the outer margin more than half-way down; near the inner border is a row of some nine or ten spinules on the surface of the plate; the second joint of the palp is considerably longer than the first, which is nearly equal in length to the third; all the three joints have setiform spines on the inner margins and outer apices, the third joint having also three groups, and the second joint one group, on the outer margin below the apex; the finger is rather slender, with a line of pectination near the inner margin, a very small nail and some cilia near it, and a dorsal cilium midway between the nail and the hinge.

First Gnathopods.—The side-plates very small, narrowed below. The first joint much longer than the side-plate, narrow, of even width throughout, smooth; second joint very long, though shorter than the first joint or the wrist, with one or two cilia-like spines upon it; third joint much shorter than the second, with scarcely any free front margin, having a group of setiform spines on the hind border near the produced acute apex; the wrist long and narrow, a little shorter than the first joint, a little longer than the hand, with a few setiform spines about the centre and at the apex; the hand long and narrow, tapering, with setæ on both edges, these edges, however, representing those of the hinder surface of the hand rather than those of the hand as usually viewed laterally; the finger slender, with some cilia near the nail.

Second Gnathopods.—Side-plates quite small, rounded in front, with two or three cilia-like spines on the lower margin. Branchial vesicle long, simple. First joint of limb long, slender, smooth, scarcely dilated below and a little curved; second joint much longer than the third but shorter than the wrist; third joint with but little free margin in front, behind furred, having one small spine high up, three longer near the pointed apex; the wrist very long and narrow, not dilated, furred on both sides, with five groups of setiform spines on the hinder margin; hand much shorter than wrist, but still comparatively long and narrow, furred both back and front, with numerous groups of spines on both borders as well as some on the surface; the spines show but little curve, the pectination, as

usual, of those in front faces backwards, of those behind forwards; the palm is defined by two stout spines, beyond which it forms a pectinate convexity, over which the small finger closes; the finger thick at the base, has a long inner tooth, near to which the margin is pectinate, and two or three cilia are placed; the dorsal cilium is nearer the base than the nail.

First Peræopods.—The side-plates are abruptly larger both in length and breadth, exceeding in size those of the two preceding segments united; they are much dilated below and rounded, with some small spines where the lower curves round to the hinder margin; the first joint massive, projecting beyond the side-plate, its hinder margin convex, with spines on the lower half; third joint broad, a little decurrent in front, much longer and larger than the fourth joint; there are some long and short spines on the hind border of both the third and fourth joints, as well as on the apex in front; the fifth joint equal in length to the third, somewhat curved and tapering, its distal rim microscopically pectinate; six groups of spines on the hinder margin, the pair at the finger-hinge showing oblique striæ; some spinules on the convex front margin; the finger small, unarmed, except for a small dorsal cilium.

Second Peræopods.—Side-plates very broad, little excavate, nearly as broad as deep. The joints of the limb closely resembling those of the preceding pair.

Third Peræopods.—Side-plates much broader than deep, fully as broad as those of the preceding pair. First joint about as broad as long, with a rounded lobe in front raised upwards, and the hinder lobe drawn downwards beyond the second joint; the front margin much spined, the hinder serrate; the third joint not much dilated, a little decurrent behind, subequal in length to the fourth and shorter than the fifth joint, like those two in having spines on both margins, and several groups of them on the front margin; finger slender, not half the length of the fifth joint.

Fourth Peræopods.—The first joint with its front margin sinuous, a little contracted before reaching the lower hinder lobe; the last four joints similar to those of the preceding pair, but rather longer. The inner margin of the finger was observed in this pair to be finely pectinate.

Fifth Peræopods.—The first joint considerably longer and a little broader than that of the preceding pair, the other joints very similar to those of the pair just mentioned.

Pleopods.—Peduncles broad and long; the two coupling spines long, having from four to five retroverted teeth; by the side of these coupling spines are three pointed spines, two of them feathered; the cleft spines are six in number in the first pair, five in the second and third pairs, as usual increasing in size successively downwards, the spoon-shaped part running out nearly as far as the serrate part, the shafts thickly plumose. The joints of the rami number from twenty-one to twenty-three.

Uropods.—The first pair not reaching so far back as the second, the peduncles longer than the rami, the rami subequal, rather deeply notched for the few lateral spines;

peduncles of second pair equal in length to the shorter of the two rami; third pair reaching much further back than the second, peduncles much shorter than the rami; rami lanceolate, spined on both sides, setose on the inner, the outer and under longer than the sharply pointed inner ramus, and ending in a long nail. Some or all of the borders of the rami are minutely pectinate; some of the lateral spines show an oblique striation, and are finely denticulate.

Telson very long, narrow, tapering, produced far beyond the peduncles of the third uropods, cleft for nearly five-sixths of its length, the inner part of each apex produced to a fine point beyond the outer part of the apex, and having in the cavity a spine with accessory thread and a cilium; there are five spines along each lateral margin. The telson, like many other parts of this species, is exceedingly thin and transparent.

Length.—The specimen in its coiled position was seven-twentieths of an inch long. The smoothness of the side-plates of the first two peræon-segments suggests that the much larger side-plates which follow are in their natural position in relation to the head and front legs, and from this it may be inferred that the coiled position of the dead specimen would not be unnatural for the living animal.

Locality.—It was labelled as taken in the tow-net, off Tahiti, the 2nd of October, 1875. This corresponds with Station 279; lat. 17° 30′ 26″ S., long. 149° 33′ 45″ W.; depth, 420 fathoms; bottom, volcanic mud. One specimen.

Remarks.—The specific name refers to the place near which it was taken.

In regard to the antennæ, side-plates and pleon, and in some other points, this species shows some affinity with the species of *Cyphocaris;* in regard to the side-plates and slenderness of the gnathopods it agrees with *Lysianassa* (?) *cymba* of Goës, but differs from that species in not having a rostrum and in having a long, narrow, much-divided telson instead of one broadly oval with the apex whole.

Genus *Euonyx*, Norman, 1867.

The original definition of the genus is:—

"Differing from *Anonyx* in having the first gnathopods chelate, and the second stronger than the first, subchelate, nail large and strong. Posterior uropods two-branched. Telson cleft."

For the inclusion of the present species, the words "nail large and strong" must be excised; on the other hand it might be well to include in the definition the statement that the side-plates of the first peræon-segment are short and small.

Euonyx normani, n. sp. (Pl. XIX.).

Rostrum rudimentary, lateral lobes of the head rounded between the upper and lower antennæ; back rounded; postero-lateral angles of the first pleon-segment rounded, of the second acute, of the third blunt, fourth pleon-segment with a dorsal depression, sixth with lateral ridges on the back curving a little outwards as they reach the telson, this segment on the under side being produced into a point between the peduncles of the third uropods.

Eyes not very distinct, apparently forming a narrow oval on the sides of the head, midway between the front and back.

Upper Antennæ.—First joint stout, subcylindrical, somewhat longer than its thickness at the base; two following joints very short, the third being deeply excavate for the brush-surface of the flagellum; the flagellum of twenty-nine joints, the first with a thick brush of cylinders in some sixteen rows, the joint equalling in length the five following united; stout spines on some of the earlier joints, stiff little cilia on all, the twenty-eight joints varying irregularly in length. Secondary flagellum of nine or ten joints, of which the first three equal the first of the primary.

Lower Antennæ.—First joint dilated below, gland-cone long, projecting nearly as far forwards as the distal end of the short third joint; fourth joint longer and thicker than fifth, with one or two terminal spines; fifth joint long, almost unarmed; flagellum of thirty-five joints, with very short, stout, distal cilia.

Epistome.—The front edge presents two curved lobes with an emargination between them, the lower lobe being much the more curved and prominent, the edge becoming straight lower down to the junction with the upper lip, the frontal portion of which is less prominent than the epistome.

Mandibles.—Cutting edge convex, with a small tooth above, and two small teeth behind the lower angle; secondary plate of left mandible small, strap-shaped, probably dentate at the tip; spine-row of three rather stout, curved spines, followed by small feathered setæ or cilia; the molar tubercle projecting far back, ciliated, not dentate; the articular condyle projecting far forward; the palp set well back, but not very far back as in *Orchomene* and *Lepidepecreum*, its first joint not extremely short, the second long, narrowest at the base, without constriction, since the muscles of the upper and lower portions overlap considerably; the row of spines of the upper portion begins some way from the inner margin and apically does not reach the outer margin; it is, as usual, on the outer surface of the palp; the third joint is short, narrow at base and apex, with both margins convex, on the inner one carrying twenty pectinate spines, and two near the base and outer margin. In the Plate, the outer surface of the right mandible is figured so that the spine-row and molar tubercle are not visible, and the upper tooth of the cutting edge is turned inward out of view; the spines of the second joint of the palp

are more numerous than shown in either of the figures *m.m.*, numbering about eighteen on each mandible.

Lower Lip.—Triangular, the forward lobes being distally narrowed; the mandibular processes straight and narrow.

First Maxillæ.—The inner plate short, apically tipped with three strongly plumose setæ, of which the outermost is a little the longest; the outer plate long; of its eleven spines three stand at intervals on the inner margin, the lowest with five, the next with six, the following with seven lateral teeth; the next spine is subapical, with six lateral teeth; in the six apical spines the number of lateral teeth varies from six to three, the subapical tooth on the outer side has four; the long and narrow second joint of the palp has four slightly curved spine-teeth and a cilium or short seta. On the left maxilla some of the spines of the outer plate had one more lateral denticle than the number counted above from the right maxilla.

Second Maxillæ.—Inner plate considerably shorter than the outer, a double row of spines and plumose setæ from the apex about half-way down the inner margin, ending as usual with a plumose seta longer than the rest; the outer plate with the usual pectinate spines on the apical part.

Maxillipeds.—Inner plates not reaching as far as the apex of the first joint of the palp, the apical margin sloping outwards, with three little pointed teeth, the two innermost close together, the third standing a little apart, followed by seven or eight feathered setæ which occupy the remainder of the margin; besides the usual long setæ which pass from the inner margin to the outer apex, the plates have on their outer surface two marginal spines below the apex and a cross-row of three small setæ; outer plates large, but not reaching so far as the apex of the long second joint of the palp, teeth of the inner margin minute and numerous, separated by more than their own width; far back on the apical margin are three spine-teeth, the largest and most-curved outermost, followed by plumose setæ down part of the outer margin; low down on the outer surface of the plate are four groups of setiform spines near the inner margin, and parallel with the marginal teeth a row of fifteen spinules, with one long spine beneath; the second joint of the palp much longer than the first, the third a little longer than the first; the finger small, its surface striated with cilia, the dorsal cilium small, centrally placed; the nail small, spiniform, with short cilia at the base.[1]

First Gnathopods.—Side-plates very small, almost concealed by those of the next segment, front margin convex; first joint subequal in length to the elongate hand; second joint much longer than either the third or fourth; the third and fourth subtriangular, so placed that the third is almost without free front, the fourth almost without free hind

[1] Besides the slender spines with which many parts of the palp are furnished, the third joint has at its apex one spine stouter than the rest, pectinate on both edges, and such a spine is, I believe, by no means unfrequent in this position.

margin; the hand drawn out into a thumb of the same length as the finger, with which it forms a complete chela; its front margin gently convex, the hind margin straight till it curves backward at the thumb, which is ciliate on the inner or palm margin with one or two spines at the tip, against which the curved and ciliated tip of the finger closes tightly; the hand tapers gently from the base, and has a few small groups of cilia; the finger is quite small, and so also the dorsal cilium near its base.

Second Gnathopods.—Side-plates of normal size, excavate in front, dilated below, the rounded lower part projecting over the base of the lower antennæ. The marsupial plate narrow. The whole of the limb slender, the first joint long, extending beyond the side-plate; the second joint longer than the third or fifth, but shorter than the wrist; the third joint furred behind, with some spines centrally and near the rounded apex; the wrist long and slender, furred, with many groups of spines on the hinder border and the surface, as also very long ones at the apex both behind and in front; the hand long and slender, somewhat oval, much furred, and beset with fine pectinate spines, some of great length; the small finger closing down among some very short stumpy spines, the outward sloping palm and inner margin of the finger wearing a pectinate appearance.

First Peræopods.—Side-plates longer, first joint shorter than in the preceding pair; third joint much longer than fourth, scarcely decurrent; armature insignificant; fourth joint somewhat shorter than fifth, with thirteen spines on the hinder margin, the first two and last two minute, the others small and short but thick; fourteen of these stumpy spines fringe the hind margin of the hand, followed by a much larger one at the hinge of the finger; on the convex front margin are five spinules; the finger is more than half the length of the hand; in this and other limbs the nail is purplish, suggesting that the animal when alive may have been of that colour or something akin to it. The bluntness of the marginal spines is probably in part due to use.

Second Peræopods.—The side-plates very broad, much broader below than at the base, the excavation carried only a short way down; the limb as in the preceding pair, but the fifth joint a little longer, and with one more marginal spine.

Third Peræopods.—The side-plates wider than deep, the hinder lobe descending below the front one. The marsupial plate short, expanded to some extent in the lower half, with its front border and apex notched, but without setæ present. The branchial vesicles in this and most of the branchial segments massive, the main sac rather placed parallel with the neck than pendant from it; a small accessory vesicle in one or more of the centre pairs. The first joint of the limb roundly quadrangular, the lower part descending behind the second joint with a width nearly equal to the basal portion; the front margin with small spines, the hinder not deeply serrate; the third joint very much longer and broader than the fourth, sharply decurrent behind, spined on both edges; the fourth joint much shorter than the fifth, with three groups of spines in front; the fifth joint not so long as the third, with seven groups of spines along the front, followed by a

larger spine at the hinge of the finger, four spinules on the hind margin; finger together with its purple nail half the length of the fifth joint.

Fourth Peræopods.—First joint much longer than in the preceding pair, and more narrowed below; the fourth joint also much longer, the limbs in other respects being very similar.

Fifth Peræopods.—First joint wider and longer than in the preceding pair, its hind border more convex, but the distal breadth equal to that at the base; the rest of the limb closely similar.

Pleopods.—The two coupling spines on the peduncles with, in some cases, as many as five retroverted teeth on one margin, the opposite margin being serrate; along with the blunt-headed spines there are three or more sharp feathered ones; the cleft spines of the rami numbering from seven to five in a series, preceded by two slender plumose setæ placed above them, both divisions of the cleft part very long and slender, the spoon-shaped part much exceeded by the other; the joints of the rami numbering from seventeen to twenty-one.

Uropods.—Peduncles of the first pair somewhat longer than the longer ramus, with numerous spines along the upper margins; eight spines along the margin of the longer ramus, six (or seven) along that of the shorter, both rami stiliform; peduncles of the second pair scarcely as long as the longer ramus, which has ten spines on one margin, five on the other; peduncles of the third pair shorter than the rami, with a group of short spines at the outer corner; the rami short, broad; the upper lying flatly over the lower and reaching almost to its nail, with five little spines on each border, the apical portion forming an equilateral triangle, of which the tip is sharp but not in any way outdrawn; the lower ramus with seven little spines on the inner, and five on the outer side, the apex being formed by a broad nail, which at its base is observably less broad than the part of the blade from which it issues.

Telson reaching beyond the peduncles of the third uropods, almost oblong but a little narrowed distally, cleft three-fourths of its length, the cleft a little dehiscent, three spinules on each lateral margin, and a fourth in the apex close to the lateral margin; beyond this the apex is slightly and squarely prolonged with a small cavity as if for a spine.

Length.—The specimen, in the position figured, measured half an inch from the forehead to the back of the third pleon-segment.

Locality.—Station 170A, near the Kermadec Islands, July 14, 1874; lat. 29° 45′ S., long. 178° 11′ W.; depth, 630 fathoms; bottom, volcanic mud; bottom temperature, 39°·5. One specimen, a female. Trawled.

Remarks.—The specific name is given out of respect to my friend, A. M. Norman, who is highly distinguished in so many branches of marine zoology, and by whom the genus *Euonyx*, to which I have referred this species, was originally instituted.

The present species resembles the type of the genus in the shape of the hand of the first gnathopods, but it has the wrist of that hand short instead of long, nor in the second gnathopods has it a strong nail like that in the type species. It agrees with the type in the lower antennæ, the side-plates of the first and second peræon-segments, and in the pleon. The mouth-organs of *Euonyx chelatus*, Norman, so far as I can judge from mounted dissections of the type specimen lent me by Canon Norman, show a general agreement with those of the present species, but the palp of the first maxilla has seven spine-teeth on the apex of the second joint, and what appears to be the outer plate of the maxillipeds has the inner margin and apex fringed with nine plumose setæ, being at the same time quite devoid of teeth.

Genus *Orchomene*, Boeck, 1870.

For the original definition of the genus, see Note on Boeck, 1870, p. 399.

Orchomene musculosus, n. sp. (Pl. XX.).

Head short, lateral lobes protruding, rounded; back rounded; lower and hind margins of the first three pleon-segments connected by curves in no way angular, fourth segment with a deep transverse dorsal depression between two humps, sixth segment dorsally ridged or folded on either side of the telson; small hairs on various parts of the integument.

Eyes not perceived.

Upper Antennæ.—First joint very tumid, scarcely longer than broad, second and third very short, the third excavate on the under side; flagellum of eleven joints, the first as long as the first of the peduncle, rapidly tapering, the brush formed of very slender cylinders, the remaining joints small, successively narrowing; some calceoli present; the secondary flagellum of four joints, the first longer than the other three united.

Lower Antennæ.—Gland-cone prominent, not acute; third joint as long as the first two united, fourth and fifth joints subequal, furred on the upper margin, with some setæ on the lower; flagellum of thirteen joints, the first six or seven together equalling in length the fifth joint of the peduncle; some calceoli present.

Mandibles.—Cutting edge convex, with a small downward-directed tooth at the top, and a small tooth behind the rounded lower angle; the secondary plate of the left mandible is a narrow, slightly curved strap, with the end divided into four small teeth; the spine-row of three short curved spines, broad at the bases; behind these the margin is furred for some distance back to the backward-pointing, narrow, dentate crown of the molar tubercle, above the hinder portion of which is a bush of fur; the articular condyle is directed far forward; the palp is set far back, behind the molar tubercle, its

first joint short, the second slightly constricted below the centre, with eleven or twelve spines near the upper end passing round to the outer apex; the third joint with the first about equalling the length of the second, widening from the base for the first third of its length, from that point narrowing to the apex, and fringed on the inner margin with nineteen or twenty spines; one spine or seta on the back near the base.

Lower Lip.—The front lobes strongly ciliated; the mandibular processes rounded, a little ciliated.

First Maxillæ.—Inner plate small and narrow, carrying on the apex two unequal plumose setæ of no great length; outer plate large, apical margin very oblique, furred, the two lowest spines broad, multidentate, standing rather apart from the rest, the other nine all powerful, the outermost with three lateral teeth, none of the others with less than four; the palp with the inner margin straight, the outer curving as the second joint expands from a narrow base almost to the apex, which in our specimen in one of the pair had eleven serrate spine-teeth and a spine, in the other eight spine-teeth and a spine.[1]

Second Maxillæ.—The plates strongly ciliated, rather long and narrow, the outer overtopping the inner; the inner plate on the very sloping apical portion carrying a row of spinules and a row of pectinate spines, ending below in a spiniform plumose seta; the pectinate spines of the outer plate not confined to the apex, but appearing some little way down the inner margin.

Maxillipeds.—Inner plates short, rather rectangular, not reaching so far as the apex of the first joint of the palp, the apical margin excavate, produced on the inner side, the process carrying at its tip a minute tooth, two others equally minute being set at intervals in the excavation; the series of plumose setæ of the inner margin is continued round to the outer apex by cilia and spiniform setæ; the outer plates large, extending beyond the second joint of the palp, the inner margin carrying fourteen little nodulous teeth, while the apical border has two much larger teeth, the inner short and broad, the outer somewhat longer and thinner; the plates carry also a row of spinules on the outer surface near the inner margins; the first joint of the palp is large, distally rounded, very little shorter than the second joint; the fourth joint ends in a very minute sharp nail, and has on its inner border near the nail a row of five cilia.

First Gnathopods.—Side-plates nearly as broad as deep, lower part of the plate produced forwards, hind and lower margins nearly straight; first joint short and massive, subequal in length to the wrist and hand combined; second, third and fourth joints all short, compact, subequal in length; the third and the wrist lightly furred behind, the third having scarcely any free front margin, and the triangular, cup-shaped wrist a very small free hind margin; the hand oblong, thickest near the base, the front margin slightly convex, the hinder margin a little angularly concave, micro-

[1] In *Oncsimoides carinatus* in like manner the palp of the left maxilla showed twelve spine-teeth, that of the right maxilla only nine; see p. 649.

scopically furred as far as the angle; the palm at right angles to the hind margin, convex, cut into irregular microscopic teeth, defined by two strong spines, between which the finger closes down; the finger, which neatly fits the palm, has, besides the dorsal cilium, one on the inner margin near the hinge, and two on the side near the tooth of the inner margin. There is a row of cilia on the hand on either side of the palm.

Second Gnathopods.—Side-plates oblong, little rounded, much narrower than the preceding pair. First joint elongate, narrow; second joint a little shorter than the wrist; third joint shorter than the second, furred behind, apically rounded and armed with long pectinate spines; the wrist furred almost all over, having the not unusual scale-like ornaments on the breast; from a narrow neck near the base the joint expands evenly to its junction with the hand, here carrying on either side long pectinate spines; the hand a little shorter than the third joint, narrow at the base, front margin convex, carrying several rows of curved spines pectinate on two edges, and occupying much of the apical margin, this part carrying also a row of setules; the very small finger set far back closes tightly down upon the small, convex, inward-sloping, pectinate palm; near the nail the finger has a denticle on its inner margin; the dorsal cilium is placed rather nearer to the nail than to the hinge.

First Peræopods.—Side-plates similar to those of the preceding pair, but larger. Branchial vesicles broad, without folds. First joint shorter than the second and third united; third joint scarcely produced downwards, much longer than fourth, subequal in length to the fifth joint; third, fourth and fifth joints with some very slender spines on the hinder margin; fifth joint narrow, with some short spines on the hinder margin; finger short, curved, with a very small dorsal cilium.

Second Peræopods.—Side-plates very broad below, much excavated behind, the joints similar to those of the preceding pair, the third, fourth and fifth rather smaller.

Third Peræopods.—Side-plates as broad as long, hinder lobe more outdrawn downwards than the front; first joint broad, a little narrowed below, scarcely longer than its breadth, attached to the middle of the lower margin of the side-plate by a sort of pocket or fold of its front margin, front margin with half-a-dozen small spines, hinder with six or seven minute notches; the third joint broad, produced downwards behind, some short spines and spine-like setæ or seta-like spines on the margins; the fourth joint a little shorter than the third, with spines on the front margin; the fifth joint much longer than the fourth, with very small spines on the front margin; finger short, curved.

Fourth Peræopods.—First joint longer than broad, attached as in the preceding pair, its nearly straight front margin with few spines, the hind margin with distant notches; the third joint longer, less expanded in proportion to its length than in the preceding pair, with two spines on its hind margin; the fourth and fifth joints likewise longer; the finger short.

Fifth Peræopods.—These are similar to the fourth pair, except that the first joint is

much larger and much more expanded above and behind; the third joint has three spines on the hind margin. The last five joints in this, as in the two preceding pairs, are much smaller than the last five of the first peræopods.

Pleopods.—The coupling spines on the peduncle are slender, with three or four retroverted teeth. The cleft spines are six in a series in the first and second pairs, five in the third pair. The outer ramus has seventeen or eighteen joints, the inner from fourteen to sixteen.

Uropods.—The first pair with peduncles longer than the slender, pointed rami; in the figure, *ur.* 1., the flat instead of the side view of these is given; the edges of the subequal rami are almost devoid of spines, but microscopically pectinate; the peduncles of the second pair scarcely as long as the rami, which are equal in length, with spines on the borders as well as pectination; the third pair have the peduncles shorter than the rami; the outer ramus with a nail, somewhat longer than the inner, both pectinate on both edges, with few spines and some plumose setæ; though shorter than the other two pairs, they project further back.

Telson elongate, distally narrowing, projecting beyond the peduncles of the last uropods; cleft not extending to the middle, more or less dehiscent for its whole length; the apices somewhat pointed, each containing a spine and a cilium; on each side near the outer margin there is a feathered cilium above, and a small spine below, the top of the cleft. In the figure, *Pl.*, the base of the telson is concealed by the peduncle of the third uropods.

Length.—The specimen, in the position figured, measured from the front of the head to the back of the second pleon-segment nearly two-fifths of an inch.

Locality.—Station 230, south of Japan, April 5, 1875; lat. 26° 29′ N., long. 137° 57′ E.; depth, 2425 fathoms; bottom, red clay; bottom temperature, 35°·5. One specimen; surface.

Remarks.—The powerful muscles exhibited by the compact first gnathopods suggested the specific name *musculosus.*

For the union of this species with Boeck's *Orchomene*, it is necessary in some respects to curtail his definition of that genus, omitting the epithet prælongata, which he applies to the inner plate of the first maxillæ, and the epithet brevissima, which he applies to the telson, as well as the statement that the telson does not reach the end of the peduncle of the third uropods. His own figure of *Orchomene pinguis* disagrees with this part of his definition, which may therefore well be dispensed with.

Orchomene abyssorum, n. sp. (Pl. XXI.).

Head apparently without any rostral prominence, lateral lobes largely developed, rounded; back rounded; pleon-segments as in *Orchomene musculosus*, except that the

convexities of the lower and hind margins of the third segment meet in a less-rounded angle.

Eyes not clearly perceived, but probably large.

Upper Antennæ as in *Orchomene musculosus.*

Lower Antennæ similar to those in the species just named, but the third joint as long as the fifth, the fourth longer than either; the flagellum of fifteen joints.

Upper Lip.—Front margin rounded in lateral view, apex strongly furred below.

Mandibles as in *Orchomene musculosus*, but having the trunk narrower behind the palp; the second joint of the palp more elongate, with eighteen to twenty spines on the upper part; and on the third joint three and twenty spines on the front margin.

Lower Lip and *Maxillæ* as in the kindred species. In the first pair of maxillæ the spines on one maxilla do not appear to agree exactly in dentation with those on the other, and in the two species some variation would probably be found upon a comparison of spine with spine.

Maxillipeds differing but slightly from those of *Orchomene musculosus*, the little marginal teeth of the outer plates being only eleven in number, the first joint of the palp rather less developed; the slender terminal joint has two cilia beside the slender spine-like nail, one on the pectinate inner margin not far from the nail, and a longer one on the outer margin also not far from the nail; near the base is a small depression on the outer margin, but without a cilium present in our specimen.

First Gnathopods.—Side-plates longer than broad, a little widened below, scarcely produced forwards, front margin nearly straight. First joint reaching beyond the side-plate, as long as the rest of the limb, not broad or expanded at any part; the remainder of the limb not massive as in *Orchomene musculosus*, but otherwise showing a remarkable similarity in detail; the pectination of the palm differs a little in the two species, but this minute character might vary in different specimens of the same species.

Second Gnathopods with the hand rather longer than the third joint, its hinder margin concave, strongly produced to antagonize with the minute finger, the very oblique lower margin being set with eight or nine curved spines, so graduated that in one of the gnathopods their tips presented an even line in continuation of the hinder margin of the hand. These spines are partially serrate on the inner side, and have an accessory thread at the tip, giving the tip a rather ragged appearance. The limb in general resembles that in *Orchomene musculosus*, and has the same delicate furring of the wrist, but the hand is considerably more produced, so as to be on a minute scale chelate rather than subchelate.

First Peræopods.—Side-plates long and narrow, of almost even width throughout. First joint reaching just to the end of the side-plate, shorter than the second and third united.

Second Peræopods.—Side-plates a little longer than those of the preceding pair, not double the width at the acute lower angle of the hinder excavation. First joint not

reaching the end of the side-plate, the limb in general like that of the preceding pair, with the fifth joint rather shorter.

Third Peræopods.—Branchial vesicles large, with a long slender appendage arising near the top of the main sac. The first joint longer than broad, with the front margin nearly straight.

Fourth Peræopods.—First joint long, not much broader above than below.

Fifth Peræopods.—The first joint large, of even breadth for much of its length, below less abruptly narrowed than in *Orchomene musculosus*, with which in general this and the other pairs of peræopods closely agree.

Pleopods.—The two coupling spines are very small, each with three lateral retroverted teeth in addition to the terminal hook. In the first pair the inner ramus carries seven cleft spines, in the third pair six; the joints of the rami number from sixteen to twenty.

Uropods.—Peduncles of the third pair much longer than the subequal, slender, stiliform rami, which carry very few and small spines; peduncles of the second pair longer than the rami; the outer ramus longer and broader than the inner, with twelve small spines set closely along its upper margin, the inner ramus with three spines on its upper margin at a distance from the apex; peduncles of the third pair as long as the shorter ramus, the rami broad, lanceolate, reaching much beyond the preceding pairs, the lower rather longer than the upper, ending with a nail, the spines on both few and small, some plumose setæ on the margins.

Telson much longer than its greatest breadth, reaching beyond the peduncles of the third uropods, cleft beyond the middle, slightly dehiscent almost the whole length of the cleft portion, each apex carrying a small spine; three small spines at intervals along each lateral margin.

Length.—The specimen, in the position figured, measured, from the front of the head to the back of the third pleon-segment, exclusively therefore of the antennæ, three-tenths of an inch.

Locality.—Station 323, east of Buenos Ayres, February 28, 1876; lat. 35° 39′ S., long. 50° 47′ W.; depth, 1900 fathoms; bottom, blue mud; bottom temperature, 33°·1. One specimen, male.

Remarks.—The specific name has been given in allusion to the great depth from which the species is reported to have come. The single specimen, a male (as shown by the ventral appendages of the seventh segment of the peræon), was mounted during the voyage. Had this species been taken within any reasonable distance of *Orchomene musculosus*, the resemblance is so great that one might have been tempted to disregard the points of difference as due to some other cause than difference of species. It might be an accident that has caused one to be reported from the surface, and the other

from so great a depth as 1900 fathoms, but that the Stations at which the two species were obtained are separated by nearly half the circumference of the globe is a circumstance not open to any such explanation. The first pair of side-plates, the hands of the second gnathopods, and the postero-lateral angles of the third pleon-segment are serviceable marks for distinguishing the two species.

Orchomene cavimanus, n. sp. (Pl. XXII.).

Rostrum obsolete, lateral lobes of the head produced, much rounded; postero-lateral angles of the third pleon-segment scarcely rounded, fourth pleon-segment with a dorsal depression, and the hinder part of the dorsal margin forming a sharpened point slightly tip-tilted and raised above the succeeding segment; sixth segment ridged on each side of the telson.

Eyes large, placed near the front of the head, wider below than above.

Upper Antennæ.—First joint tumid, second and third very short, third excavated below; flagellum of thirteen joints, the first as long as five of the following joints together, the brush of cylinders in ten or eleven rows, cylinders on many of the other joints also; secondary flagellum of five joints, of which the first is much the longest.

Lower Antennæ.—Gland-cone moderately prominent but small, third joint longer than the composite first and second, and as long as the fifth joint; fourth joint longer than the fifth, both being furred on the upper margin; flagellum of fifteen or sixteen small joints in the female specimen here described.

Epistome prominent, with a rounded lobe curving down just over and in front of the top of the upper lip. The Plate gives a figure representing the epistome between the palps of the two mandibles, with the upper lip, two mandibles, and lower lip in position; the left mandible with its secondary plate is shown projecting a little in advance of the right mandible; the inner side of the right mandible is figured on the other side of the Plate.

The Mandibles and *Lower Lip* resemble those of *Orchomene musculosus*, but with the parts adjacent to the molar tubercle less furred, and the palps more slenderly built, the third joint being also shorter in comparison with the second.

First Maxillæ similar to those of *Orchomene musculosus*, but the inner plate more elongated.

Second Maxillæ.—Outer plate broader than inner, not very much longer, spine-fringed border not very oblique; armature of inner plate as in *Orchomene musculosus*.

Maxillipeds narrow, inner plates reaching nearly as far as the apex of the first joint of the palp, with three teeth on the straight apical margin; outer plates scarcely reaching as far forward as second joint of palp, with fourteen small nodulous teeth on the inner, and reaching round to the apical margin, with two much larger teeth on the outer part of

the apical margin, the outer of the two being the longer and thinner; the first joint of the palp substantial, nearly as long as the second, the fourth joint slender, with a small nail; a dorsal cilium near the nail, and a row of four cilia near it on the inner surface.

First Gnathopods.—Side-plates widened below but not much outdrawn in front; first joint of great thickness, exceeding in length the third, fourth and fifth united; the second, third and fourth subequal in length; the second with several setæ along its hind border, the third with no free front border, the hind border furred, carrying a group of spines near the apex; the small free hind margin of the triangular cup-like wrist furred; the hand oblong, but a good deal broader at the base than at the palm; both hand and finger very similar in the details to those of *Orchomene musculosus*.

Second Gnathopods.—These differ from those of *Orchomene musculosus* in that the wrist is not longer than the second joint, and, instead of being most expanded close to the apex, is here most expanded midway between the third and fifth joint, so as to have a plump instead of an elongate appearance; the hand is also less elongate, and the little palm is deeply excavate, the process which bounds it being squared and pectinate apically, carrying a pectinate spine; the inner end of the finger appears to be armed with a brush of microscopic cilia or denticles, and when this antagonizes with the hinder process of the palm there is a clear space left between the palm and inner margin of the finger. The marsupial plate is narrow, with very long setæ.

First Peræopods.—The oblong side-plates are of even width throughout. The branchial vesicles are very long and very broad except at the neck, without folds. The joints of the limb similar to those in *Orchomene musculosus*, with which in general the other limbs also agree.

Third Peræopods.—The side-plates rather less elongated behind.

Fourth Peræopods.—The branchial vesicle behind the neck presents two lobes, one ascending the other descending, below and in front of which the main part of the vesicle consists of a large circular expansion, against which lies a narrow accessory sac of about equal length, curved at the tip.

Fifth Peræopod.—The branchial vesicle is here a simple sac which rises a little above and descends a great way below its point of attachment; the outline is convex in front, concave behind, the straight upper margin running obliquely downwards to form a small but conspicuous backward-directed process. The first joint of the limb is extremely expanded behind and only very slightly narrowed below.

Pleopods of the third pair with four cleft spines on the first joint of the inner ramus, those of the second pair with five.

Uropods.—Peduncles of the first pair considerably longer than the rami; rami slender, with few spines, a series of five on one edge of the outer, of four on one edge of the shorter inner ramus; edges of the rami microscopically pectinate; peduncles of the second pair longer than the rami, which are equal in length to one another; peduncles of

the third pair shorter than the rami, rami lanceolate, with few spines, the inner finely pointed, not reaching to the nail of the outer, both bordered within with plumose setæ.

Telson extending fully as far back as the peduncles of the third uropods, cleft for three-quarters of its length, narrowed distally, a spine above and another below the middle of each outer margin, and one in each apex; all these with accessory threads.

Length, without the antennæ, two-fifths of an inch.

Locality.—Kerguelen Island. The particular place or depth was not recorded in regard to the specimen figured and described. A second specimen was taken at the surface in Betsy Cove, and a third at Station 149h, off Cumberland Bay; depth, 127 fathoms; bottom, volcanic mud.

Remarks.—The specific name refers to the cavity in the palm of the second gnathopods. In the course of the description the differences have been noticed between this and the very similar species, *Orchomene musculosus*, taken at an enormously distant station to the south of Japan. The present species agrees better with Boeck's definition of *Orchomene* in so far as the inner plate of the first maxillæ is elongate, but agrees worse with it, in so far as the large outer plates of the maxillipeds, though perhaps extending as far as the second joint of the palp, cannot be said, in accordance with the definition, to extend beyond it. Boeck himself does not seem to have laid much stress on the latter point, since, in describing *Orchomene serratus*, the type species, he says that the outer plates of the maxillipeds reach about to the end of the second joint of the palp.

Genus *Lysianax*, altered from *Lysianassa*, preoccupied.

Lysianassa, Milne-Edwards, 1830.

For the original definition, see Note on Milne-Edwards, 1830 (p. 141). Boeck, in 1872, thus defines this genus, which, since its first institution, has been much subdivided:—

"Mandibulæ mala in margine anteriore dente parvo, sed longo, tenui instructa; palpo elongato, in eadem altitudine ac tubereulo molari minuto affixo.

"Maxillæ 1mi paris lamina interna permagna, in apice setam parvam aut obsoletam gerenti.

"Maxillæ 2di paris lamina interiore lata, exteriore angusta.

"Pedes maxillares lamina exteriore ovata vixqve in margine interiore nodulosa, non ad finem articuli 2di palpi elongati angustiqve porrecta; lamina interiore elongata.

"Antennæ superiores articulo pedunculi 2do et 3tio paulo elongatis.

"Pedes 1mi paris manu non subcheliformi; articulo 5to elongato, apicem versus attenuato; ungve parvo.

"Pedes saltatorii elongati; ramis paris ultimi brevioribus qvam pedunculo, setosis.

"Appendix caudalis parva, integra, postice rotundata."

In this definition, in the account of the mandibular palp, I propose to insert the words *vel profundius* before *affixo*, in the description of the telson to place instead of *postice rotundata* the words *vel parum incisa*, and in that of the maxillipeds to omit the measurement of the outer plates.

Lysianax variegatus (Stimpson) (Pl. XXIII.).

1855. *Anonyx variegatus*, Stimpson, Proc. Acad. Nat. Sci. Philadelphia, p. 394.
1862. *Lysianassa variegata*, Sp. Bate, Brit. Mus. Catal. Amphip. Crust., p. 67, pl. x. fig. 7.

Head short, rostrum minute, lateral lobes produced into a rounded angle; back rounded, slightly hairy; third segment of the pleon with lower margin upturned, so that the postero-lateral tooth, which is not a very sharp one, comes high up on the hind margin; the fourth segment but little dorsally depressed, the sixth produced far along the sides of the telson.

Eyes large, reniform, bending round from the top of the head to the lateral lobes, very dark-coloured in the spirit-specimens, the ocelli numbering perhaps a hundred and fifty.

Upper Antennæ.—The first joint tumid, not very long, carrying some groups of setæ as well as a row of feathered cilia; the second joint, though much shorter and narrower than the first, is much longer than the third; the flagellum of eight joints, of which the first is rather shorter than the second of the peduncle, the cylinders of the brush forming some fifteen rows in this narrow space; the remaining joints, becoming successively shorter and much narrower, likewise have cylinders; the secondary flagellum is of four joints, the last minute, the first nearly as long as the first of the primary.

Lower Antennæ.—The gland-cone not very prominent, the third joint short, the proportions of the fourth and fifth not constant; in a specimen with an eight-jointed flagellum the fifth joint of the peduncle, as shown in fig. B, did not very greatly exceed the length of the fourth joint, whereas in the specimen represented in fig. C the fifth joint is double the length of the fourth, and the fourth is much inflated; both joints have groups of cilia on the upper edge, the fifth joint has its lower margin smoothly convex, and instead of being widened distally as in the smaller form, is distally narrowed; this is evidently the form belonging to the adult male; there are calceoli with their attendant cilia on many of the fifty-three joints of the slender flagellum; the calceolus is of narrow oval form with continuous rim. With the form of the male antennæ above described may be compared the figures in the British Sessile-eyed Crustacea of the lower antennæ of the species there called *Lysianassa longicornis* and *Anonyx longicornis;* a similar form of the lower antennæ in the male is to be met with in genera outside of the Lysianassidæ.

Epistome presents a rounded lobe ascending almost to meet the triangular lateral

lobes of the head; the front edge of its thin plate seems to be sharp, and is very straight. In one specimen there was a little tooth in the front part of the rounded top.

Upper Lip short, its distal edge densely fringed with short fur.

Mandibles.—These are very long and narrow; the cutting edge has at the top a little pointed tooth, the lower border almost or quite entire; I was not able to perceive any trace of a secondary plate, though the rudiment of one might have been present notwithstanding, concealed by the folding of the principal plate, but what could be seen of the new mandible in preparation, which is perfectly flat, gave no indication of this; the spine-row consists of three curved spines not far from the cutting-plate, followed by a long close-set row of short thick cilia, reaching to the small, triangular, ciliate, not dentate, molar tubercle; at a considerable distance behind this rises the palp, its first joint comparatively long, the long second joint with its lower part thickest, carrying a row of eight or nine pectinate spines at the distal end; the third joint curved, not twice as long as the first, the two together scarcely equalling the length of the second, with spines on the middle of the inner margin and on the apex, and adpressed cilia on the surface. The articular condyle, which in some genera overlaps the base of the palp, is here at an immense distance from it, being just over the three spines of the spine row.

Lower Lip much furred round the apex and long inner margins; the mandibular processes narrow, not much produced.

First Maxillæ.—Inner plate long, narrow, ciliated, with an almost pointed apex, without any setæ in the specimens examined; outer plate large, the somewhat sloping apical border fringed with eleven spines, of which seven are stout, those near the inner margin especially broad and multidentate, but inserted below the uppermost spines are four slender and curved ones apically forked but not otherwise dentate; the palp is slender, its second joint apically divided into five or six small teeth, beside which a spine rises from an indent on the outer margin.

Second Maxillæ.—The inner plate as long as the outer, and broader; a row of fifteen pectinate spines from the apex some way down its inner margin; the apical border of the outer plate is crowned with much longer spines which over-arch those of the inner plate.

Maxillipeds.—Inner plates very long, reaching beyond the middle of the second joint of the palp, inner margins densely clothed with cilia, in the adult hiding the apical outward-sloping margin, which in a young specimen can be seen to possess three minute teeth or prominences indicative of teeth; the outer plates very large, projecting rather beyond the second joint of the palp, with no sign of teeth or spines on the indentured inner and apical border; of the setiform spines on the inner border of the third joint the shorter ones have unusually thick accessory threads; second joint of the palp much longer than the first; finger very small, much shorter than the third joint, with a slender adpressed denticle lying along the base of the small spiniform nail.

First Gnathopods.—Side-plates broad, much produced in front below; first joint scarcely reaching to the lower rim of the side-plate, of nearly equal breadth throughout, with setæ on the front margin; third joint short, triangular, hind margin convex, furred, with setæ near the apex; wrist stout, scarcely as long as the hand, with the front margin almost adjoining the second joint, the hind margin where free a little furred, with setæ at the apex; the hand at its base narrower than the wrist, distally scarcely broader than the base of the finger, where it has a tuft of small spines or setæ; the borders are rather sinuous (though considerably less so than in the figure *gn.* 1. c.), with some setæ on the hinder one; the finger is short, very slightly curved, seemingly with no capacity for bending against the hand; it has a denticle like that in the finger of the maxillipeds.

Second Gnathopods.—Side-plates widening gradually and slightly downwards; first joint as long as the third, fourth and fifth combined, distally widening and bending backwards; second joint rather longer than the wrist, third joint much shorter, narrow at the base, then expanding, the very convex hinder margin furred, and having a group of spiny setæ near the apex; the wrist starting with a narrow neck swells out and again narrows somewhat apically; it is densely furred almost all over, and has scale-like ornaments on the breast; the hand, narrow at the base, widens a good deal towards the distal end; it is densely furred, some of the cilia outstanding, others adpressed and gracefully waved; near the palm on the breast some scales are conspicuous; the convex palm is set on both sides with minute straight cilia, and forms a recess with the apical portion of the hind margin, into which the short finger closes down; the finger, set at some distance from the front margin of the hand, is thick at the base, over-arched with many spines set in rows upon the hand's front or apical margin, the spines of various lengths, but each seemingly having a short tooth on the convex side before the apex is reached. The branchial vesicles of this and the following pairs exhibit many cross folds or pockets; they narrow towards the distal end.

First Peræopods.—Side-plates similar to those of the preceding pair; third joint longer than fourth, apex produced downwards; long, finely plumose setæ on the hind borders of both third and fourth joints, and a row of ten spines along the hind border of the fifth joint, which equals the third in length; the third, fourth and fifth are edged on both borders with cilia apparently in simple rows, not thickly set so as to constitute furring; the finger curved, with clean edges, except for the dorsal cilium.

Second Peræopods.—Side-plates broad, the excavation not carried far down, the joints similar to those of the preceding pair, except that the fifth is a little shorter, with nine spines instead of ten. The branchial vesicle with a large accessory pocket at the top.

Third Peræopods.—Side-plates much broader than deep, broader below than above; first joint broad, rounded, the very convex front margin furred above, with long setæ below, some short spines on different parts; the serration of the hind margin presenting only five points above and three small indents lower down, each carrying a cilium; the

third joint dilated centrally and produced downwards behind, with setæ on both margins and spines on the front one; the fourth joint short, dilated below; the fifth joint much longer and narrower, both with groups of spines in front; the finger curved, clean-edged, but at the forward-bulging curve just below the hinge microscopically furred.

The Fourth and Fifth Peræopods are similar to the third, but with the various joints more elongate, the first joint in each being outdrawn downwards, narrowly in the fourth and more broadly in the fifth pair.

Pleopods.—The coupling spines, examined only in a small specimen, had two lateral teeth and a small one at the apex; the number of the cleft spines was not ascertained.

Uropods.—The first pair extend back some way beyond the other two pairs; they have the peduncles longer than the rami, carrying a few curved spines, and are, like the whole group of these uropods, finely ciliated on the edges; the rami are straight, slender, edged with spines, equal in length, the tips scarcely curved; of the second pair the peduncles are equal to the longer of the two rami, which are slender and very slightly curved; the peduncles of the third pair are longer than the rami, and have spines on the outer and plumose setæ on the inner of their upper edges; of the rami, which are broadly lanceolate, the outer is rather the longer, both have long plumose setæ on the inner edges, the inner also some spines on its outer edge.

Telson short, not very much longer than broad, reaching but a little way down the peduncles of the third uropods, not much contracted distally, the distal end squared, broken by a gaping notch measuring not one-fifth of the total length of the telson; on either side just above the level of the top of the notch is a small spine, above this again a small and a larger feathered seta.

Length.—Specimen A measured, in the position figured, from the forehead to the end of the second segment of the pleon, two fifths of an inch, so that the total length of this, which was not the largest specimen, would be nearly three-fifths of an inch.

Locality.—Simon's Bay, Cape of Good Hope; depth, 18 fathoms.

Remarks.—The account which Stimpson gives of his *Anonyx variegatus* is as follows:—"Large, slightly compressed; back rounded, smooth and glossy, with a sinus at the abdomen. Antennæ about equal in length, the superior ones thickened to the origin of the accessory flagellum, which is short and hair-like, equal in size with the true flagellum. Eyes large, black, reniform. First pair of legs with an elongated, tapering hand and a minute finger; basal joints of the posterior pairs smooth. Caudal stylets elongated and slender. Colour yellowish mottled with brown, with scattered white dots. Length, ·08 inch. On sandy bottoms in the circumlittoral zone. Hab. Cape of Good Hope, at Simon's Bay."

Spence Bate gives the length of the specimen sent him by Stimpson as "about $\frac{12}{20}$ths of an inch," in other words, about three-fifths of an inch. Since Stimpson himself

describes the species as large, it may be taken for granted that "·08 inch" in his account is a misprint for "·8 inch," equivalent to four-fifths of an inch. There can, I think, be no doubt that the Challenger species is identical with Stimpson's, and though the incised apex of the telson and the palp on the mandible set far behind the molar tubercle are features that will not agree with Boeck's definition of *Lysianassa*, I think that Spence Bate rightly referred this species to that genus. It is the definition of the genus that must be modified, not the species that ought to suffer exclusion.

Genus *Lepidepecreum*, Bate and Westwood, 1868.

For the original definition of the genus, see Note on Bate and Westwood, 1868 (p. 373); now that the genus is somewhat better known, it may be defined as follows:—

Upper Antennæ with the secondary appendage small or rudimentary.

Lower Antennæ with the third joint comparatively long.

Mandibles with the palp narrow, set well behind the dentate molar tubercle.

First Maxillæ.—Inner plate not elongate, carrying two plumose setæ at the apex; outer plate with one of its eleven dentate spines standing a little apart from the rest; the palp carrying several little spine-teeth and one spine on the truncate apex.

Second Maxillæ.—The outer plate a little longer than the inner, both plates rather narrow and elongate.

Maxillipeds.—Outer plate with a few nodulous teeth on the inner margin, the plate reaching beyond the rather short second joint of the palp; the fourth joint of the palp ending in a sharp nail.

First Gnathopods not robust, hand and wrist subequal in length, hand subcheliform.

Second Gnathopods with the hinder margin of the hand outdrawn.

Telson more or less cleft.

There is only the minute rudiment of a secondary appendage on the upper antennæ of the type species of *Lepidepecreum*. A small and two-jointed appendage is figured for *Lysianassa umbo*, Goës, which Boeck calls *Orchomene umbo*, but which G. O. Sars would refer to *Lepidepecreum*. The species here referred to that genus has numerous points of similarity with the species described by Goës.

Lepidepecreum foraminiferum, n. sp. (Pl. XXIV.).

A small rostrum; lateral lobes of the head outdrawn, very long and narrow; the whole animal dorsally sharply ridged from one end to the other, on the last two segments of the peræon and first three of the pleon the ridge forming a distal tooth; the lower

edges of the first four pairs of side-plates and of the first joints of the last three pairs of peræopods brought so closely into contiguity from either side of the body as to form a straight ridge scarcely less sharp than the carina of the almost semicircular dorsal line. From the very narrow front the body bulges greatly to the fourth or fifth peræon-segment, and then again narrows to end as sharply as it begins. Of the peræon-segments the fourth, fifth, and sixth are the longest and deepest. The third segment of the pleon has the postero-lateral angles sharp, in the slightest degree upturned. The fourth segment has a deep dorsal depression, the part behind the dorsal depression strongly tip-tilted, the sixth ridged on the back on either side of the telson.

Eyes not discovered.

Upper Antennæ.—In the male, first joint large and broad, the upper ridge continued into a process overhanging the second joint; the second and third joints short, very much narrower than the first; the flagellum of six joints, the first broad at the base, tapering, as long as the other five united, with four rows of cylinders near the distal end; cylinders also on the next three joints; the secondary flagellum very slender, of three joints, together not equal in length to the first of the primary; of the three, the first longer than the second, the third minute. In the female these antennæ are slightly more slender, the flagellum of five joints, with the first not quite so long as the other four united, the secondary flagellum two-jointed.

Lower Antennæ.—Gland-cone prominent, third, fourth, and fifth joints subequal in length in the male, the fifth slightly the longest, the flagellum in one of the pair of antennæ attaining the number of thirty-six joints, the first longer than the next two together, the joints all gradually tapering, not bulging distally. In the female the third joint is as long as the fourth, and each of these much longer than the fifth, while the flagellum consists of four or five slender joints. In both sexes the fourth and fifth joints of the peduncle are more or less ciliated above.

Epistome.—The front of the animal is formed by the dorsal ridge of the first peræon-segment, the head and the upper antennæ, so that it would be inaccurate to speak of the epistome as prominent, but when the head and mouth-organs are detached and viewed without the antennæ, the expression would become appropriate.

Mandibles.—The cutting edge convex, with a small downward directed tooth at the top, and a very small forward directed tooth behind the rounded lower angle; secondary plate strap-shaped, bent, the apex cut seemingly into three denticles; spine-row of three slightly curved spines; the molar tubercle well forward near the spine-row, its oval crown set with rows of denticles, and a central row of four or five more prominent and isolated than the rest; the slender palp, set far back, has on the long second joint near the apex a row of six or seven spines, increasing successively in length as they approach the apex; on the upper half of the third joint eleven spines, the first six separated by a slight interval from the apical five.

Lower Lip.—Forward lobes strongly furred on the inner margins, their outer margins and the mandibular processes unciliated.

First Maxillæ.—The inner plate rather small, with two plumose setæ of unequal size at the apex; the outer plate large, the innermost of the apical spines standing out a little apart from the other six strong ones, these and the four more slender ones a little below all strongly dentate; the palp with seven small teeth and a ciliated spine on its truncate apex, the teeth in one of the pair of maxillæ appearing to be longer than those in the other.

Second Maxillæ.—The inner plate not much shorter than the outer, with six spines on the apex, three on the inner border, and a plumose seta, the border below this seta being, in common with the surface of the plate, very finely ciliated (not coarsely as in the figure *mx*, 2, ♀); several curved pectinate spines on the apex of the outer plate, one rising from the inner margin just below the apex.

Maxillipeds.—Inner plates reaching as far as the apex of the first joint of the palp, with plumose setæ on the inner margin, on the apical margin three teeth, followed by two curved pectinate spines, the shorter outermost; the outer plates reaching beyond the second joint of the palp, with eight small teeth on the inner margin, not adjoining but spaced, and a single less-embedded tooth on the apical margin; second joint of palp scarcely longer than first; fourth joint with a slender nail, a dorsal cilium near the centre, and a cilium on the inner margin near the nail.

First Gnathopods.—Side-plates triangular at the base, then oblong, with a slightly curved lower margin; the first joint longer than all the rest of the limb, a little expanded in the lower half; the third joint scarcely longer than the second, furred behind, with some spines near the apex; wrist long, furred behind; hand subequal in length to the wrist, nearly parallel-sided, much longer than broad; palm slightly concave and oblique, defined by two long spines; finger not longer than palm, with a dorsal cilium, and one or two cilia near the tooth on the inner margin.

Second Gnathopods.—Side-plates long. Branchial vesicle with a narrow lobe below. First joint slightly expanded and scarcely bent below, not reaching to the end of the side-plate, and not as long as the third, fourth and fifth joints united; second joint subequal in length to the wrist; third joint shorter, flask-shaped, furred behind, two short setæ near the rounded apex; wrist flask-shaped, lightly furred on the front margin, the side, and the breast, which has also the microscopic fan-shaped scales common in this family; the hand subequal to the third joint, narrow at the neck, then expanding, the hinder margin outdrawn so that the palm slopes inward with the minute finger resting close upon it, the anterior part of the apical margin occupied by a small number of the usual spines; on different parts of the hand there are cilia longer than those composing the fur; the finger is set back from the front margin of the hand, with the outdrawn hinder portion of which it forms a minute chela; it is

stout at its base, and ends in a narrow hooked nail; the dorsal cilium is fixed at about the centre.

First Peræopods.—Side-plates long, expanding gradually from above; first and second joints together not reaching to the end of the side-plates; third joint broader but not so long as the fourth; fourth not so long as the fifth, some fine setæ on the hinder margin of the second, third and fourth joints, on the fifth three or four cilia at intervals on each margin, and on the hinder two small inward-curving spines close to the finger-joint; the finger long and slender, with a dorsal cilium close to the hinge.

Second Peræopods.—Side-plates with a rather deep but not wide excavation. Fourth and fifth joints rather shorter than in the preceding pair.

Third Peræopods.—Side-plates with breadth and depth subequal. First joint a little longer than broad, of nearly even diameter throughout, with spines on the front margin, the hinder serrate; the third joint expanded, produced behind, longer and much broader than the fourth; the fourth shorter than the fifth, which is straight, narrow, somewhat tapering; one or two spines on each of the three last-mentioned joints; the finger long, thin, and straight, but the whole of the limb beyond the first joint insignificant in size compared with that joint, and that joint itself considerably smaller than the side-plate.

Fourth Peræopods.—The side-plates with front and hind margins parallel, lower margin outdrawn behind in a rounded lobe; first joint longer than that of preceding pair, front margin not spined above; in other respects the joints very similar to those of the preceding pair, the third a little less expanded.

Fifth Peræopods.—First joint very large, upper and front margins nearly straight, hinder very convex, the narrowed part below partly overlapping the third joint, front margin spined nearly to the top, hinder serrate, this joint much longer than the other five united; spines on both margins and some setæ on the front margin of the expanded third joint, which is produced downwards behind; the fourth joint short, the fifth subequal in length to the third, the finger slender, slightly curved at the tip, not stumpy as it happened to be abnormally in the specimen figured.

Pleopods.—The cleft spines form a row of five in the first pair, of four in each of the following pairs. The round-headed spines on the peduncles of the first pair appeared to have three retroverted teeth. The joints of the rami numbered from fourteen to seventeen.

Uropods.—Peduncles of first pair longer than the rami, outer ramus with four spines along the margin, longer than the inner, which has two spines; both peduncles and rami microscopically pectinate; peduncles of the second pair slightly longer than the rami; outer ramus longer than inner and with more numerous spines; third pair with the rami broadly lanceolate, a little longer than the peduncles, each spined on one

border, the longer, which is the lower and inner, also with plumose setæ and a conspicuous nail.

Telson, in one specimen, female, not reaching the distal end of the peduncles of the third uropods, in another specimen, male, reaching beyond them; cleft not so far as the centre, not dehiscent, a spine in each half of the apex, a feathered cilium on each side about level with the top of the cleft, and two spines lower down.

Length of female, in the position figured, one-fifth of an inch; two other specimens the same size; two much smaller.

Locality.—Station 149H, off Cumberland Bay, Kerguelen, January 29, 1874; depth, 127 fathoms; bottom, volcanic mud. Five specimens. Dredged.

Remarks.—The specific name alludes both to the general appearance of this compact and rounded little species, and to the little bright spots looking like perforations in the integument, to each of which a microscopic cilium appears to be attached. The figure of the third peræopod indicates this character. The species seems to have some affinity with Boeck's genus *Menigrates*, but in that genus the mandibles are described as very short, with a short palp, and the first gnathopods as very robust, with the hand scarcely subcheliform. In *Orchomene*, which comes near to *Menigrates*, the hands in question are very short, robust, longer than the triangular carpus. *Ambasia* has the third joint of the lower antennæ elongate, but was in other respects unsuitable. *Lepidepecreum* seems to be the genus in which the present species can be most appropriately placed.

Genus *Socarnoides*, n. gen.

Mandibles very elongate.

Lower Lip with front and hind lobes outdrawn, narrow.

First Maxillæ having the inner plate devoid of plumose setæ, and the second joint of the palp without apical spine-teeth.

Maxillipeds with the inner and outer plates long, apically narrowed, the outer plates extending far along the third joint of the palp, without teeth or nodules on the inner margin; palp narrow, second joint very long.

Second Uropods with the inner branch incised.

Telson little cleft.

Remarks.—From Boeck's *Socarnes* (see Note on Boeck, 1870, p. 397) the present genus differs chiefly in the apically narrowed plates, both outer and inner, of the maxillipeds, and the smooth inner margin of their inner plates, as well as in the absence of setæ from the inner plates and of teeth from the palps of the first maxillæ.

Socarnoides kerguelensi, n. sp. (Pl. XXV.).

A compact species with all the side-plates and the coxæ of the last three pairs of peræopods well developed, but the terminal joints of the legs and the uropods of small size. Scattered hairs rise along the back from the head, the peræon and the three large anterior segments of the pleon. Rostrum obsolete; lateral angles of the head rounded, projecting. Third segment of pleon with lower hinder angles rounded.

Eyes large, reniform; crystal cones short, some sixty or seventy in number.

Upper Antennæ.—First joint tumid, longer than the two following joints of peduncle combined, carrying several feathered cilia on the convex upper margin; third joint scarcely if at all shorter than second, both narrowing distally; flagellum of eight joints, first shorter and much thinner than third joint of peduncle, as long as three that follow, but these and the remaining joints are quite small. They carry filamentary cylinders and cilia. The slender secondary flagellum of four joints is nearly as long as the first four joints of the primary, its first joint shorter than that of the primary, and its fourth joint minute.

Lower Antennæ.—Slender, first three joints very short, the fourth a little widened distally, as long as the fifth of the peduncle and the first of the flagellum together; flagellum tapering, consisting of seven joints, the first as long as the second and third united; the seventh minute.

Epistome prominent, the lower part drawn down into a sharp point in front of the furred and rounded distal border of the *Upper Lip*.

Mandibles narrow and elongated; cutting edge with a small tooth at the top; secondary plate of the left mandible linear, perhaps distally dentate; spine-row of three short curved spines; molar tubercle little prominent, with no show of teeth but bordered with short cilia. The articular condyle projects forward above the space between the spine-row and the molar tubercle. The palp is shorter than the trunk of the mandible, inserted far behind the molar tubercle; the first joint short, the third curved, shorter than the second; there are two small setæ at the apex of the third, and two near the distal end of the second. The third joint of the palp was accidentally missing in the specimen from which the figures *m.m.* were drawn.

Lower Lip prominently ciliated round the free borders except on the narrow mandibular processes, which have but few cilia. The cilia are crowded on the narrow distal portion of the front lobes; centrally these latter are wider in proportion than represented in the figure, the delicate texture and the structure of the organ making it difficult to flatten it out for drawing under the microscope. It should be remembered that the lips and maxillipeds *in situ* are often far from being the flattened objects to which it is necessary to reduce them in mounted preparations for drawing the details under high powers.

First Maxillæ.—Inner plate slender, distal portion ciliated; outer plate carrying distally seven thick dentate spines, the innermost having eight (and sometimes more) teeth on its edge besides the apical one; four other spines, much more slender, of varying length, and but little dentate, are ranged on the side of the plate; the surface of the plate is ciliated near the spines; the enlarged figure shows the growth of the new spines within the plate, in which it will be observed that the innermost spine above mentioned faces in the opposite direction to that which it has when set free. The palp is a thin broad plate set upon a very short first joint; the basal is much broader than the distal half, which is bluntly pointed, and has slight serrations round the apex.

Second Maxillæ.—Inner plate a little shorter than the outer, ciliated on the inner border, a row of seven or eight serrate spines at and near the apex. Outer plate ciliated, apically armed with setæ and spines; the spines more or less serrate distally with curved tips, one conspicuously longer than the rest, not serrate, a little clubbed at the end.

Maxillipeds.—Inner plates reaching as far as the distal end of the second joint of palp, tapering almost to a point, with one little spine-tooth on the inner side of the apex, and one or two similar teeth and some small setæ on the distally serrate outer margin. Outer plate large, reaching far along the third joint of the palp or beyond it, the apex obtusely pointed, the inner margin with a solitary seta. There is an appearance of canals within the substance of the plate radiating towards the outer margin and distal part of the inner margin, the margin itself being microscopically indented in correspondence with the ends of these canals. First joint of palp with a seta at the distal end of its very short inner margin; second joint with its inner border twice as long as the outer border of the first joint, having three long and one or two short setæ at and near the distal end; third joint longer than first, longer and less dilated than shown in the foreshortened figure, borders naked except distally; fourth joint small, tapering, second half narrowed somewhat suddenly, ending in a short sharp nail with a cilium on each side of it.

First Gnathopods.—Side-plates broad, with a few cilia on the surface near the front and lower margins, and a small notch near the distal end of the hind margin. First joint a little curved, widened distally, having five setæ on the front border; second joint with five on the hind margin, two of them very short; third joint triangular, hinder part a little furred, with a group of setæ distally; wrist (not furred as it is in *Lysianassa kidderi*, S. I. Smith), subequal in length to the hand, but stouter, with distally a small group of setæ in front and a large one behind; hand tapering, having in front some slight setæ, and a row of six behind along the inner side of the margin, with three longer and two short ones on the outer side of it. Most of these setæ narrow a little abruptly near the middle as if two-jointed. The finger short, with a curved nail, set on the extremity of the hand so as to leave no palm.

Second Gnathopods.—Side-plates narrower than those of first segment, ciliated and

notched in the same way, outer margin convex, hinder nearly straight. Branchial vesicle with a fold near the base. First joint a little curved, slightly dilated distally, with one or two fine setæ on the antero-distal part of the margin; second joint much longer than third, with the lower half of hinder part furred, and one terminal seta; third joint short, shaped like a pipe-bowl, furred behind, carrying one or two setæ; wrist equal in length to second joint, considerably longer than the hand, thickly furred nearly all over; hand longer than broad, densely furred, hinder margin running out into a small thumb beset with short spines; close to the thumb is set the short finger, thick at the base, the much-curved nail over-arching the thumb. Between the front margin of the hand and the finger is a bunch of straight spines, greatly varying in length, with curved tips.

First Peræopods.—Side-plates like those of the second segment. Two setæ on hind border of second joint; third joint longer and much wider than the fourth joint or the fifth, with one seta on the outdrawn antero-distal angle, and four on the hind margin; fourth joint wider but shorter than fifth, with four setæ on the hind margin; fifth joint narrow, with four short setæ on the hind margin and a spine at the junction with the finger, a cilium in front not one-third of the margin's length from the end, a bunch of cilia at the end; finger curved, with the usual cilium near the beginning of the front margin.

Second Peræopods.—Side-plates broad, excavated behind. The leg not materially differing from the preceding.

Third Peræopods.—Side-plates broad, front margin very convex, front lobe descending decidedly below the hinder one; first joint very large, very convex in front, widest above; front margin carrying two spines in the upper part, in the lower serrate part spines and setæ alternating; hinder margin notched, with cilia in the notches; the short second joint is overlapped by the hinder lobe of the first joint; the third joint is shorter than the fifth, distended in the middle, having three setæ on the front margin, and two spines on the hinder one; fourth joint shorter than third, with one or two spines and setæ; fifth joint slender, with three pairs of spines on the front border, the hinder margin and finger as in the first peræopods.

Fourth Peræopods.—First joint much longer and a little wider than that of the third peræopods; its third joint on a larger scale, longer than the fifth joint, the armature of the joints in general similar to that of the preceding and following pairs of legs.

Fifth Peræopods.—First joint a very irregular oval, much longer and considerably wider than the first joint of the fourth peræopods, the third joint less developed than in that limb; on the hinder margin of the third joint a row of three spines, on the outdrawn apex two and a seta.

Pleopods.—Eight to ten articulations compose the rami; there are ten plumose setæ on the dilated basal joint of the outer ramus.

Uropods.—Peduncle of first pair rather longer than the rami, outer ramus rather

longer than inner, the latter with one spine, the former with three spines on the margin; second pair shorter than first, peduncle a little longer than rami, rami subequal, outer with four spines on the margin, inner with a small one before the middle and a larger one some way beyond the middle of the margin, at a point where the ramus is deeply notched and narrowed, as in species of *Ichnopus* and some other genera. Third pair shorter than second, peduncle outdrawn to a spine-tipped point on the inner side; outer ramus longer than inner, with a nail bearing an accessory thread near the tip on the outer side; adjoining the nail on the inner side is a spine with an accessory thread on the inner side. The inner ramus has a cilium on the inner margin near the base, and one in a small slit in its sharp apex. In the smaller specimen the details of spines and cilia showed some variation; for example, in the second uropods the outer ramus had two spines instead of four, the inner had one instead of two.

Telson small, reaching beyond the outdrawn sides of the sixth pleon-segment, narrowing distally, carrying near the border on each side, beyond the middle, a long and a short plumose cilium; a little beyond these the slit begins, each terminal triangle having in its blunt apex a cilium and a spine with an accessory thread rising nearer the base of the spine than its apex.

Length of larger specimen, with tail folded in and antennæ bent down, less than a quarter of an inch.

Locality.—Station 149E, Greenland Harbour, Kerguelen, January 21, 1874; depth, 30 fathoms; bottom, volcanic mud. Two specimens. Dredged.

Station 149H, off Cumberland Bay, Kerguelen, January 29, 1874; depth, 127 fathoms; bottom, volcanic mud. One specimen. Dredged.

Remarks.—Through the kindness of Professor S. I. Smith, I have had the opportunity of comparing this species with a specimen of *Lysianassa kidderi*, to which it shows some resemblance, but the differences are very decisive. In that species the outer plate of the maxillipeds is rounded; in the first gnathopods the first joint is not bent; in the second gnathopods the wrist is not so long as in the present species; the side-plates in the fourth segment, and the first joints of the last three pairs of peræopods, all differ strikingly; the telson is slightly excavated, not cleft.

Genus *Ambasia*, A. Boeck, 1870.

For the original definition of this genus, see Note on Boeck, 1870 (p. 397). To include the species here described, it must be modified by omitting the epithet "minima" from the description of the inner plate of the first pair of maxillæ, and the epithet "fissa" from the description of the telson.

Ambasia integricauda, n. sp. (Pl. XXVI.).

This minute species externally, except in colour, so much resembled *Socarnoides kergueleni*, that the single specimen was dissected before the differences were appreciated, hence no whole figure could be given, and the line in the plate indicating the natural size is an estimate instead of a measurement. The specimen was a female with eggs.

There are some small scattered hairs on the back. The hinder lateral angle is rounded in each of the first three segments of the pleon, rather sharply so in the third, which has the lower half of the lateral margin outdrawn ; the fourth segment without any dorsal saddle-shaped depression.

Eyes present ; shape not observed.

Upper Antennæ tapering, first joint long and stout, with a few fine scattered hairs, second joint half the length of first, third not much shorter than second, flagellum of five joints together shorter than first joint of peduncle. To these joints are attached cylindrical appendages, most of which surpass in length the whole flagellum. In the slender two-jointed secondary flagellum the first joint is slightly longer than the first joint of the primary, the second shorter than the second of the same, tipped with fine hairs.

Lower Antennæ.—The opening of the coiled gland not conical ; the third joint as long as the fourth ; the latter a little curved and rather longer than the fifth ; the whole peduncle slender, not tapering ; the flagellum of four joints, the last one minute ; there are long tapering setæ on the three last joints both of the peduncle and of the flagellum.

Mandibles broad at the base, narrowing to a neck in advance of the cutting edge. The cutting edge is convex, rounded below, with a slightly prominent angle or tooth above. Behind this angle a sort of dentation or wrinkling appears; the secondary plate of the left mandible rather broad, with a convex front edge. In the Plate the outer surfaces of the mandibles are shown, so that the left mandible is represented by the figure *m* on the right hand ; the true shape of its cutting-edge and secondary plate will be best discerned in the interior of the figure, which shows the new mandible in preparation for appearance after the next skin-shedding. The spine-row consists of three very short serrate spines. The palp has the first joint unusually long, subequal in length to the third ; the margins are naked, the second joint has a small spine or seta close to the distal end, the third joint is tipped with two setæ of about its own length, and has on the side the fine adpressed hairs usual in this joint.

Lower Lip.—Mandibular processes elongate.

First Maxillæ.—Inner plate broad, distally rounded, with one short hair-like seta at the inner distal angle ; outer plate rather broad, distally edged with a row of seven variously denticulate spines, the outer ones stoutest and least denticulate, and a row of four smaller spines, scarcely denticulate; palp with first joint short, second long, over-

topping the outer plate, tipped with four short slightly sinuous spines, and having its inner margin and sides hairy. The figure shows the growth of the new inner and outer plates within the old ones.

Second Maxillæ.—Outer plate a little broader than inner and a little overtopping it, distally tipped with seven or eight weak spines a little curved, and about the same number of shorter straight ones. The distal end of the inner plate bordered with six or seven weak spines, the row ending up with a seta on the inner margin. Fine hairs project along the major part of the otherwise smooth inner margin.

Maxillipeds.—Inner plates long, narrow, with outer margin slightly bowed, reaching beyond the first joint of the palp; distal margin indented, and perhaps armed with three small teeth, a few small setæ on the inner distal and near the distal margin; outer plates very large, broad, the rounded distal edges reaching halfway along the third joint of the palp; inner and distal margins faintly crenulated, quite naked, though within the border there is a show of preparation for spines or setæ; some way within the inner and not very far from the distal border there is one spinule. Palp with first joint broadest, outer edge much longer than inner, the latter carrying distally one seta; second joint with outer edge shorter than inner, the latter fringed with ten or eleven setæ; third joint narrow, with five setæ, three on distal half of inner margin; fourth joint very small, divided between nail and finger.

The little *triturating organs* show on each of the pair a row of from nine to ten serrate spines.

First Gnathopods.—Side-plate irregularly triangular, with some short hairs within the broad distal border and a notch at the posterior distal angle. First joint a little widened distally, two short hairs on front margin; hinder part of the short second and third joints furred with short hairs, wrist and hand subequal in length, wrist a little widened distally, front margin curved, two or three setæ at infero-posterior angle; hand tapering, setæ on or near hinder margin few and short, no noticeable palm; finger short.

Second Gnathopods.—Side-plates less widened below than those of the first segment so as to form more of a parallelogram than a triangle, otherwise similar; first joint narrow, with one seta on the front margin; second joint longer than third; third shaped like the bowl of a pipe; wrist longer than hand, a brush of fine hairs on the hinder side followed by one seta near the distal end; hand furred almost all over, hinder margin longer than front, running out into a small thumb, close to which is placed the finger with a broad base and a narrow terminal hook beset with short cilia. The sloping distal margin of the hand in front of the finger carries four large spines graduated in length from before backwards, all with terminal accessory threads; other less powerful spines are set more on the side of the hand, and the hinder border is fringed with tooth-like spines.

First Peræopods.—Side-plates like those of the second segment; they fully cover the

first two joints of the leg; third joint longer than fourth, shorter than fifth, wider than either, a little outdrawn antero-distally, with three longer and two shorter setæ on the hind margin; fourth and fifth joints slender, with few setæ, and one spinule at the postero-distal angle of the fifth joint; finger long and curved.

Second Peræopods.—Side-plates deeply excavate behind, deeper than their greatest breadth; branchiæ on this pair, no doubt accidentally, very small.

Third Peræopods.—Side-plate much larger than first joint of leg, only slightly bilobed, hinder much less curved than anterior margin; first joint subcircular, some cilia on lower part of anterior margin; second and third joints both considerably shorter than in the two preceding pairs.

Fourth Peræopods.—Side-plate squarish, smaller than first joint; the latter ovoid, infero-posteriorly produced, ciliated in front; the third joint wider, not longer than in the preceding pair.

Fifth Peræopods.—Side-plates smaller than the preceding pair, having like them a minute infero-posterior notch; first joint much broader and longer than in the preceding pair, front margin naked except at the lower angle, hinder margin irregularly rounded, crenulate, produced below. The two next joints as in the preceding pair. The fourth fifth, and sixth joints were missing from the last four pairs of peræopods.

Pleopods.—These are rather peculiar in structure The broad peduncle carries two branches very differently shaped; the outer branch has its first joint nearly as long as the peduncle, very broad near the base, ciliated on the outer edge round the broadest part, and with six plumose bristles along the lower part, increasing in length as they approach the short second joint; the third joint is narrower than the second; the fourth, much narrower and shorter than the third, concludes the series. They are furnished with the usual long plumose setæ. The inner branch has the first joint long and narrow, together with the short second joint equalling the length of the first joint of the outer branch, like which it has a third and fourth joint but no more; in the third pair the second joint is coalesced with the first. The two coupling spines are very small and slender and appear to be quite straight. A single short bent spine at the distal end of the first joint of the inner ramus seems to be the representative of the cleft spines.

Uropods.—The first pair have the peduncle equal in length to the outer ramus; the inner ramus is a little shorter. On the peduncle there are three spines with accessory threads near the tips; there is one on the outer and probably also one on the inner ramus. The second pair are shorter than the first; the peduncle subequal in length to the outer ramus, which is rather longer than the inner; each ramus has one spine and the inner edge finely pectinate. The third pair is much shorter than the second, the outer ramus longer than the inner, and about as long as the peduncle, with a terminal nail so large as almost to look like a second joint. On the inner ramus there is a cilium near the base. The edges of both rami are like those of the second pair.

Telson.—Broad at base, tapering to a rounded end, without suture or emargination; on either side of the apex there is a long cilium, and a very short one on either side higher up.

Length less than three-twentieths of an inch.

Locality.—Station 149D, Royal Sound, Kerguelen, January 20, 1874; depth, 28 fathoms; bottom, volcanic mud. One specimen.

Remarks.—The colour of the specimen in spirit was greyish. The Challenger species differs from Boeck's *Ambasia danielssenii* by having the inner plate of the first maxillæ moderately large, the first joint of the flagellum of the upper antennæ but little longer than the second, the fourth pleon-segment without a dorsal depression, and the telson not cleft. The specific name *integricauda* is intended to call attention to this last-mentioned circumstance.

Genus *Amaryllis*, Haswell, 1880.

1880. *Amaryllis*, Haswell, On Australian Amphipoda, Proc. Linn. Soc. N.S.W., vol. iv. p. 253.
1882. *Amaryllis*, Haswell, Catalogue of the Australian Stalk and Sessile-eyed Crustacea, p. 227.

Mr. Haswell's definition is as follows:—

"Superior antennæ with a well-developed appendage. Mandibles with a palp. Maxillipedes with well-developed squamiform plates. Anterior gnathopoda subpediform. Posterior gnathopoda imperfectly subchelate. Rami of the fourth and fifth pleopoda styliform; those of sixth pair broad, lanceolate. Telson squamiform, cleft."

He places it in the subfamily Stegocephalides of the British Museum Catalogue, the definition of which he gives in Spence Bate's words:—

"Superior and inferior antennæ subequal. Coxæ of the second pair of gnathopoda and of the first and second pairs of pereiopoda monstrously developed; second pair broader than the preceding. Pereiopoda subequal. Last three pairs of pleopoda styliform. Telson single."

From the Stegocephalides of Spence Bate, however, *Amaryllis* differs in having only the coxæ or side-plates of the second peræopods monstrously developed, and in having a well-developed secondary appendage on the upper antennæ, while the genera assigned to the Stegocephalides have none or only a rudimentary one.

From the Stegocephalinæ of Boeck *Amaryllis* is separated by having a three-jointed palp on the mandibles and by not having a palp on the first maxillæ, as well as by other characters. It can better stand among the Lysianassidæ. In the definition which Boeck gives of his subfamily Lysianassinæ, it will be necessary, with a view to this genus, and in a less degree with a view to Boeck's own genus *Aristias*, to prefix the word *plerumque* to the epithet *perparvo* applied to the second and third joints of the peduncle of the

upper antennæ. In regard to the first joint of the flagellum of the upper antennæ, *Amaryllis* must stand as an exception within the family.

To suit the transfer of the genus to a different family, the following new definition is proposed :—

Upper Antennæ, contrary to the general character of the family, having the second joint of the peduncle not very short, and the first of the flagellum not very long, devoid of a conspicuous brush.

Mandibles.—The spine-row containing many spines; the molar tubercle ciliated, not dentate; the palp set behind the middle of the trunk.

First Maxillæ.—The inner plate carrying two plumose setæ; palp wanting.

Maxillipeds.—The inner plates reaching beyond the first joint of the palp; the outer plates large, without spine-teeth; the fourth joint of the palp small, obtuse, without a nail.

First Gnathopods, not subchelate.

Side-plates of the fourth peræon-segment greatly developed.

Telson cleft.

Amaryllis bathycephalus, n. sp. (Pl. XXVII.).

Head very deep, rostrum minute, the sides of the head scarcely outdrawn in a flattened lobe between the upper and lower antennæ, this sinuous portion being marked off from the lower part by a small incision; the last two segments of the peræon deeper than those preceding them; the first three segments of the pleon with the postero-lateral angles acute, in the third segment abruptly upturned so as to leave a little pocket low down in the hinder margin of the segment; the dorsal depression of the fourth segment very shallow.

Eyes large, inversely lageniform, being larger above than below, the ocelli small.

Upper Antennæ.—First joint cylindrical, more than twice as long as broad, equalling in length the two following joints of the peduncle added to the first of the flagellum; the second joint rather longer than the third, the third longer than the first of the flagellum; the flagellum of ten or eleven joints successively decreasing in thickness, all provided with long cylinders, the first joint not longer than the second; the secondary flagellum of three joints equalling in length the first three of the primary.

Lower Antennæ shorter than the upper, the peduncle rather longer than that of the upper antennæ; first joint strongly lobed below, gland-cone slight but prominent, third joint short, fourth rather longer and thicker than fifth, equalling in length the first three of the flagellum; flagellum slender, of nine joints, of which the first is the longest.

Mandibles.—Cutting edge very slightly convex, with a tooth above and another below; secondary plate of the left mandible widened distally and divided into five or six not very prominent teeth; spine-row of several short spines set among cilia; molar tubercle weak,

armed apparently only with cilia, many of which are directed backwards; palp set some way back, over the backward-turned molar tubercle; first joint short, second without spines (in our specimen), third short, together with the first not equalling the length of the second, with four or five spines on or close to the apex, and many adpressed cilia on its surface; there is a small raised process of the trunk midway between the palp and the cutting edge.

Lower Lip with the cilia on the apex of the forward lobes almost spiniform; a small projecting lobe on the inner margin a little below the apex.

First Maxillæ.—Inner plate short, an irregular oval, with two short, unequal, plumose setæ on the inner side of the rounded apex; outer plate long, with some cilia-like spines just below the apical margin, the dentate spines strong, no doubt eleven in number, but so crowded together that they cannot easily be counted; the lowest and innermost spine with four or five lateral teeth, that represented in the Plate with only one being no doubt accidentally broken; the next spine to this in the lower row has eleven small lateral teeth, the others fewer. I have not been able to find any trace of a palp, unless a little fold of the outer margin of the outer plate may point to a lost inheritance.

Second Maxillæ.—The outer plate longer than the inner, and rather broader, both narrowing distally, the spines of the outer plate descending further along the inner border than those of the inner plate; the outer plate also with three or four small feathered spines descending its outer margin.

Maxillipeds.—Inner prismatic plates extending much beyond the first joint of the palp, the upper part of the inner margin strongly furred with cilia which pass over to the outer corner of the apex; apical margin undulating into three prominences, the most advanced being the inner one, each having a spine-tooth which in our specimen does not project beyond the margin; a small spine is on the outer margin just below the apex; the outer plates of thin texture, broad, apically rounded, extending beyond the second joint of the palp, seemingly unarmed except for fine hairs on the surface and for cilia-like spines within the inner margin, not reaching beyond it; first joint of the palp short, with a seta at the apex on each side, second joint longer than first, but itself rather short, with half a dozen setæ on the inner margin; third joint longer than the first, with a few setæ at and near the apex; finger somewhat conical, very short, without a nail, at the apex carrying two long setæ.

First Gnathopods.—Side-plates small, triangular, much overlapped by those of the second segment, not reaching down to the lower part of the head or base of the lower antennæ. First joint of the limb attached low down on the side-plate, beyond which it projects far, narrow, longer than the third, fourth, and fifth joints united, with very short setæ at intervals on the front margin; second joint longer than the third, not quite so long as the fourth; the third triangular, with the point downwards; the wrist more or less triangular, with the point upwards; there are pectinate spines on the hind margin of

this and the two preceding joints; the hand considerably longer than the wrist, tapering distally so as to have no palm, almost the whole of the hinder margin pectinate, with setæ at intervals, and a few pectinate spines on the side; finger short, curved, with a dorsal cilium near the hinge, one on the inner margin, and one or two at the nail.

Second Gnathopods.—Side-plates small and narrow, longer than those of the first segment. First joint narrow, a little bent back distally, about equal in length to the wrist and hand united; second joint longer than the third, shorter than the hand; third joint with a solitary cilia-like spine near the pointed apex; wrist longer than the hand, with the hind margin straight, furred, and carrying some pectinate spines, chiefly at the lower end, the front margin nearly parallel with it, smooth; the hand long, dilating gradually towards the palm, wider than the wrist, furred on the hinder margin, with groups of pectinate spines on the lower part of it; the palm oblique, slightly sinuous, with a row of three short stout spines near the angle on one side and one or two more on the other, cilia along its course, and some minute pectination; the small, curved finger, hinged very near the front margin amid over-arching pectinate spines, does not nearly reach the end of the palm; its dorsal cilium is very long.

First Peræopods.—Side-plates narrow, oblong, with a distally narrowed termination, a little longer than those of the preceding segment. First joint shorter than the side-plate, its front margin straight, the hind convex, with very short setæ at intervals; third joint broader than fourth, equal in length, scarcely decurrent; fourth joint shorter than the fifth, with three spines along the hind margin; fifth joint with the hind margin straight, front convex, armed only with some minute cilia; finger straight to the sharp, slightly curved tip; dorsal cilium close to the hinge, very small.

Second Peræopods.—Side-plates greatly developed, the front margin straight, extending forward below the head, the side-plates of the three previous segments forming a triangle, the apex of which is shut in below by the lower angle of the head on one side and the fourth side-plate on the other; its lower margin is curved, and the curve is continued so as to form a large rounded lobe behind, where the excavation causes the upper part of the side-plate to be not more than one-third the width of the lower part; there are minute cilia set round the edge and on some other parts; the joints of the limb are similar to those of the preceding pair, but the fourth and fifth joints are here a little shorter.

Third Peræopods.—The side-plates with the hinder lobe produced much below the front one; the first joint with the front margin nearly straight and armed with a few small spines, the hinder margin sinuous, running out into a smooth-edged, rounded, backward-directed lobe, so as to be much broader below than above; second joint overlapped behind by the lobe just mentioned; the third joint very much broader than the fourth, decurrent, spined on both borders; fourth joint shorter than the hand, spined on the front margin, largely overlapped behind by the decurrent part of the third joint;

hand with some small spines on the front margin, this joint and the finger very similar to these in the two preceding pairs.

Fourth Peræopods.—Side-plates small, somewhat produced downwards behind. First joint a broad oval, the lower lobe behind overlapping the second joint, the front margin with strong spines except at the upper part, the hinder margin not strongly serrate; the third joint broad, decurrent, spined on both margins; the rest of the limb missing.

Fifth Peræopods.—The first joint broader and longer than that of the preceding pair, front margin spined, hinder serrate, with its broadly rounded lower lobe produced beyond the second joint; third joint narrower than in the two preceding pairs; in other respects the joints similar to those of the third peræopods.

Pleopods.—There are some slender spines on the margins of the peduncles; the coupling spines are slender, with two lateral retroverted teeth and the apices acute, little bent; there are two cleft spines in the second pair, only one in the third pair; the arms of the cleft are nearly equal, apparently neither of them having a spoon-shaped termination; the joints of the rami number from eight to eleven.

Uropods.—The peduncles of the first pair longer than the rami; the rami stiliform, with few marginal spines, the outer ramus longer than the inner; peduncles of the second pair about equal to the rami, inner ramus longer than the outer, projecting beyond the rami of the third pair; peduncles of the third pair shorter than the rami, which are subequal, not very broadly lanceolate, with three marginal spines on the outer side of the outer ramus.

Telson not reaching nearly to the end of the peduncles of the third uropods, longer than broad, cleft scarcely beyond the centre, not dehiscent, with convex sides narrowing distally, the apices rounded.

Length.—The specimen, in the position figured, measured from the rostrum to the back of third pleon-segment a little over one-fifth of an inch.

Locality.—Station 161, off Melbourne, April 1, 1874; depth, 33 fathoms; bottom, sand. One specimen. Trawled.

Remarks.—The specific name, from βαθύς, deep, and κεφαλή, a head, refers to the very conspicuous depth of the head in this species.

Through the kindness of Mr. W. A. Haswell I have had an opportunity of comparing the present species with a specimen of his *Amaryllis brevicornis*, which he distinguishes from his *Amaryllis macrophthalmus* only by the greater shortness of the antennæ. The specimen he sent me was a female with young, and there can be in my opinion no doubt that *brevicornis* should be entered as a synonym of *macrophthalmus*. From this the Challenger species differs, not only in having much less numerously jointed flagella to the antennæ, the secondary of the upper having three joints instead of thirteen (in the

specimen sent me by Mr. Haswell), but also in several details of the mouth-organs, and in having a shorter wrist to the first gnathopods, the hand of the second more expanded distally, the side-plates of the fourth peræon-segment rounded behind instead of squared, those of the fifth segment more and more narrowly produced downwards behind, and the first joint of the third peræopods pear-shaped, being narrow above and postero-distally expanded.

Amaryllis haswelli, n. sp. (Pl. XXVIII.).

Head similiar to that of *Amaryllis bathycephalus*, with a rather stronger rostrum, the whole animal of rather narrower habit than that species; postero-lateral angles of the third pleon-segment acute, not upturned, the hinder margin bulging a little beyond the point and so forming a little pocket, which occurs in all the three species of the genus at present known.

Eyes probably present, but not clearly observed.

Upper Antennæ.—The first joint of the peduncle elongate, with a depression above near the base, distally prolonged on the inner side into a tooth more than half the length of the following joint; the second joint shorter and much thinner than the first, about three times as long as the third, having a short distal tooth; third a little longer than the first joint of the twenty-four-jointed flagellum, the joints of which carry not very conspicuous cylinders; the secondary flagellum of four slender joints, the first two together scarcely exceeding in length the first of the primary.

Lower Antennæ.—The first joint very much outdrawn below, the gland-cone small, the third joint short; the fourth joint nearly twice as long as the fifth, as long as the first of the upper antennæ without the tooth; the fifth joint rather longer than the first four of the twenty-two joints of the flagellum.

Triturating Organs.—These present a row of a few spine-teeth, short, stout, serrate on both margins, followed by a row of similar spines, but more numerous and rather longer and thinner, beyond these again a close-set fringe of bristles appearing.

Mandibles.—The cutting edge slightly convex, with a small tooth at the top, the secondary plate of the left mandible with the distal edge obscurely dentate; the spine-row as in the preceding species consisting of numerous spines among cilia; that some of the ten spines were slender and others stumpy was probably due to the more worn condition of the latter; molar tubercle weak, directed backwards, set only with cilia; the articular condyle advanced over the spine-row; the palp set rather far back over the molar tubercle, the long second joint without spines; the third joint, together with the first not quite equalling the length of the second, having nine spines along the upper part of the inner margin, one at the apex very large, and adpressed cilia as usual on the surface. In the Plate the outside of the left mandible is represented in the lower

figure *m*, so that the secondary plate, spine-row, and molar tubercle are not in view except so far as their position may be gathered through the partial transpareney of the mandible.

Lower Lip.—The forward lobes strongly ciliated on the apical and inner margins, scarcely dehiscent; the mandibular processes long, narrow, curving outwards.

First Maxillæ.—Inner plate small, with two unequal plumose setæ on the apex; the outer plate also closely resembling that in *Amaryllis bathycephalus*, with eleven strong, variously dentate spines at the distal end, and a small fold of the outer margin near the base.

Second Maxillæ scarcely differing from those of *Amaryllis bathycephalus*, the outer plate less narrowed apically than the inner.

Maxillipeds.—Similar to those of the species just mentioned, but differing in having the inner plates rather shorter and broader, with the apical margin less oblique, and in having the apical margin of the outer plates less evenly rounded. The fourth joint of the palp is narrow, its obtuse apex carrying two setæ; it it not quite so small as in the two companion species.

First Gnathopods.—Side-plates small, more than half concealed by those of the next segment, the length and breadth equal, the front and lower margins rounded, the hinder straight, the first joint attached at the lower hinder extremity, greater in breadth throughout than any other joint, and nearly or quite equalling the united length of the four following; numerous setæ on the sinuous front margin, a few on the straight hind margin, which has a long tuft at the end; the second joint widened below, as long as the third; the third pointed below; the wrist longer than the long tapering hand, carrying on its hinder margin several groups of spiniform setæ such as occur in smaller numbers on the two previous joints; the hand is strongly pectinate along the hind border, where it also has spines and setæ; there are also groups of setæ along the surface, besides some small ones on the front border; there is no palm; the small curved finger has a tooth lying along the inner edge near the nail; it has also a dorsal cilium near the hinge, and one or two cilia on the inner margin.

Second Gnathopods.—Side-plates more than twice as long as those of the preceding segment, the back border angled below the centre, the lower border a little serrate and crenulate, not ragged as in the figure *gn.* 2. The branchial vesicles from a narrow neck expanding at once to the greatest breadth, thence narrow gently downwards, and are as long as the first joint of the limb. The marsupial plates narrow, with small cilia on the front margin; on the hind margin and apex no setæ were present in our specimen, but the points of attachment indicated that they either had been or were to be. The first joint of the limb not so long as wrist and hand united, attached just above the angle of the hind margin of the side-plate, below bending a little backwards; the second joint longer than the third; the third ending in a long triangle with three or four cilia-like setæ on the hind margin; the wrist very long and narrow, nearly twice as long as the

hand, the hind margin densely furred for most of its length, the setæ few, some long ones at the apex; the hand long and narrow, furred densely along the hind margin; with several spine-like setæ on the lower part; on the lower part of the front margin some very long spines, besides smaller ones, over-arching the small much-curved finger, which nearly covers the narrow apical or palm margin of the hand.

First Peræopods.—Side-plates oblong, narrow, reaching over the lower front angle of the head, the lower border serrate at each end and slightly crenate in the middle. The marsupial plates longer than the first joint of the limb, distally bent. The first joint long and narrow, reaching beyond the side-plate; the third joint not so long as the fourth or fifth, with five groups of setæ on the hinder, and two or three on the front margin; the fourth and fifth joints equal in length, both carrying setæ and spines, the fifth having a row of eight spines on the hind margin; the finger short, worn at the tip.

Second Peræopods.—Side-plates very broad, except at the excavation, which does not extend far down, the front margin straight, and so also the hind margin below the excavation, the front and hind margins slightly diverging downwards; the first joint not reaching beyond the side-plate, the third, fourth, and fifth joints subequal; the limb in general like that of the preceding segment.

Third Peræopods.—The side-plates much wider than the first joint of the limb, the back lobe produced considerably below the front one. The first joint scarcely longer than broad, front margin a little convex, with spines at six points, the hind margin irregular, not much serrate, producing the greatest width two-thirds of the way down, then with an oblique curve reaching but not overlapping the second joint; the third joint somewhat decurrent, longer and much broader than the following joint, with spines at five points in front and three behind; the fourth joint shorter than the fifth and scarcely broader, with spines at four points in front; the fifth joint somewhat longer than the third, with spines at seven points in front; finger not a third of the length of the preceding joint, with a rounded end as if worn by use.

Fourth Peræopods.—Side-plates broader below than above, with the angles behind rounded, but squarish in general appearance. Branchial vesicles of the general form of an oval, bent very much forwards and in front, at the neck having an accessory vesicle attached, of something the same shape, on a very much smaller scale. The first joint is oblong, with a rounded lower margin just overlapping the short second joint, the front margin spined, the hind margin irregularly serrate; the lower joints of the limb missing.

Fifth Peræopods.—The side-plates with the hind margin more convex than in the preceding segment. Branchial vesicles small, looking like a wide flask, narrow-mouthed, attached by its handle. The first joint similar to that of the preceding pair, but larger, and with the lower margin squared and roughly serrate, the third joint

a little decurrent, with four groups of spines on each margin; the remaining joints as in the third pair, but they are now missing.

Pleopods.—Peduncles with a few setæ or slender spines on the peduncles; no coupling spines perceived; the cleft spines of the inner ramus four in number; the joints of the rami about sixteen to eighteen in number.

Uropods.—The peduncles of the first pair somewhat longer than the stiliform rami; the peduncles of the second pair shorter than the lower ramus, which stands a little within the shorter upper ramus; the latter is bordered with eight strong spines, the former has half a dozen on its inner edge, and below these a longer one on a rounded point, below which the ramus is suddenly constricted, as in *Ichnopus* and various other genera; the peduncles of the third pair shorter than the stiliform, subequal rami, both of which have some spines on the margins.

Telson not reaching the end of the peduncles of the third pair, narrowed below, cleft a little beyond the centre, a little dehiscent below, especially at the apices, where the inner margins curve a little outwards; cilia on the apices and near the lateral margins some way below the top of the cleft.

Length of the specimen, seven-fifteenths of an inch.

Locality.—Station 78, off the Azores, July 10, 1873; lat. 37° 26′ N., long. 25° 13′ W.; depth, 1000 fathoms; bottom, volcanic mud. One specimen; female. Dredged.

Remarks.—The specific name is given in compliment to Mr. W. A. Haswell, by whom the genus *Amaryllis* was instituted.

From the other two species of the same genus, as well as from all other known species of the Lysianassidæ, this is remarkably distinguished by the long second joint of the upper antennæ. The exceptional character of the form gives a sort of guarantee that it was actually obtained from the exceptional depth of 1000 fathoms.

Amaryllis macrophthalmus, Haswell, juv. (Pl. XXIX.).

It was not till very long after the Plate had been engraved for this species that I received a specimen of Mr. Haswell's *Amaryllis brevicornis*, which is in my opinion synonymous with his *Amaryllis macrophthalmus*. The little specimen now to be described was taken at an enormous distance from Australia, and if no regard be paid to the differences which exist between the young and adults of Amphipoda, as of most other animals, it would be easy to consider it a new species.

The body compact; head deep, reaching to the fourth side-plate, between which and the head the other three side-plates are as it were shut in; the mouth-organs projecting conspicuously; the postero-lateral angles of the third pleon-segment acute, not upturned.

Eyes small.

Upper Antennæ.—First joint scarcely longer than the two following united; flagellum of five joints, together not longer than the peduncle; secondary flagellum of two joints, not so long as the first two of the primary.

Lower Antennæ.—Gland-cone prominent, third joint very short, fourth longer and thicker than fifth; flagellum tapering, of five joints, the first as long as the fifth joint of the peduncle.

Mandibles.—Cutting edge smooth, with a small tooth at the upper corner; secondary plate of the left mandible with the broad apical margin cut into four or five denticles facing towards the cutting edge; the spine-row of six or seven small spines; the molar tubercle not prominent, directed backwards, a little ciliated; the palp set rather far back, just over the molar tubercle, the third joint not much shorter than the second, with conspicuous adpressed cilia, and at the apex three setæ. The shaft of the mandible is rather less slender than it appears in the position represented in the figures *m.m.*

First Maxillæ.—Inner plate oval, only one plumose seta observed on the apex; outer plate seemingly with nine denticulate spines, no palp.

Second Maxillæ.—Inner plate with seven or eight apical spines or setæ; outer plate rather longer than the inner, similarly furnished.

Maxillipeds.—Inner plates very long, the apical margin with two little cavities between the three teeth, below which are some spines on the outer margin; outer plates broad and long, one long seta far down on the inner margin, the rest of which is smooth, the apical margin scarcely crenate; the third joint of the palp nearly equal in length to the second; the fourth minute, without a nail, tipped with two setæ.

First Gnathopods.—The first joint longer than the next three together, the second longer than the third, and as long as the fourth, all these four carrying apical spines behind; the hand longer than the wrist, tapering distally, with a few setæ on or near the hind margin and apically in front; the hind margin strongly pectinate, with no palm margin; the finger short, a little curved, with a dorsal cilium near the hinge, and one or two lying along the inner edge by the nail.

Second Gnathopods.—First joint projecting beyond the side-plate, not as long as the wrist and hand together; second joint longer than the third, the wrist longer than the hand, parallel-sided for most of its length, tufted with fur on the hind margin, where also apically it has some long setæ; hand long, almost parallel-sided, furred behind, with long spines at and near the apex on each margin; palm convex, bordered with minute cilia and defined by two short spines; the finger thick at the base, curving over the palm, with a dorsal cilium and some cilia on the inner edge near the nail.

First Peræopods.—Side-plates oblong, the front margin straight, the hinder a little sinuous and the lower convex; the first joint not reaching the end of the side-plate, the third rather longer than the fourth and shorter than the fifth; the nail curved, more than half the length of the fifth joint.

Second Peræopods.—Side-plates broad, front and hind margins straight, almost parallel, the excavation behind not carried far down; the joints of the limb as in the preceding pair.

Third Peræopods.—Side-plates broader than the first joint, the hinder lobe produced below the front one; first joint irregularly rounded, the front margin being almost straight, with one spine at the lower apex, the rounded lower margin overlapping the second joint, which also has a spine at the apex in front; the third joint broad, decurrent, with spines at two points on each margin; the fourth joint shorter than third or fifth, with spines at the apex; fifth joint longer than third, with spines at two points in front, cilia behind; finger curved, more than half the length of the fifth joint.

Fourth Peræopods.—Side-plates not bilobed. First joint broader than side-plate, with two spines in front, a little serration on the hind margin; the limb resembles in general character that of the preceding segment, but with the various joints rather larger.

Fifth Peræopods.—Side-plate consisting of a single lobe, rounded behind and below, narrowed in front; first joint broader and longer than in the preceding pair, the rest of the limb similar but smaller, the third joint being smaller than the third in the third peræopods, while the remaining joints are rather longer than in that pair.

Pleopods.—In all the pairs two coupling spines with two retroverted hooks, a single cleft spine on the long first joint of the inner ramus, the inner ramus three-jointed, the outer five-jointed.

Uropods.—Peduncles of the first pair but little longer than the rami; lower ramus a little longer than the upper, each with a spine at some distance from the acute, little-curved apex; peduncles of the second pair shorter than the rami; lower ramus with a nail, longer than the upper, each with a spine at some distance from the apex, that on the longer ramus marking the point at which the ramus is abruptly narrowed, a feature belonging, I think, to all the species of this genus; peduncles of the third pair shorter than the rami, lower ramus longer than the upper, with a nail, both finely pectinate on the edges.

Telson projecting beyond the peduncles of the third uropods, cleft a little beyond the centre, carrying a couple of cilia inserted a little above each apex, and a couple also on each side below the level of the top of the cleft.

Length of the specimen, from the front of the head to the end of the third pleon-segment, in the position figured, about one-fifth of an inch.

Locality.—Station 313, off Cape Virgins, Patagonia, January 20, 1876; lat. 52° 20′ S., long. 67° 39′ W.; depth, 55 fathoms; bottom, sand. One specimen. Trawled.

Remarks.—Between this specimen and the much larger adult female from Australia, for which I am indebted to the kindness of Mr. Haswell, the chief differences are in the eyes and antennæ. The eyes in the Australian specimen accord with Mr. Haswell's

description of those in his *Amaryllis macrophthalmus*, in being "vertically elongated, sub-crescentic"; the upper antennæ have seventeen joints to the primary flagellum, and thirteen to the secondary. In Mr. Haswell's own description he assigns to the principal flagellum "about thirty segments," and seven to the secondary; in the form which he calls *Amaryllis brevicornis* he says that the principal flagellum has eighteen joints, and the secondary five. This part would appear, therefore, to be very variable in the species.

Genus *Acontiostoma*, n. gen.

Body compact, head scarcely or not at all visible laterally.

Upper Lip with a pointed apex.

Mandibles long and narrow, without molar tubercle; a small three-jointed palp set close to the base.

First Maxillæ with the inner plate small, carrying one seta at the apex, the outer plate with the apical spines set close together, the palp small, not reaching the end of the outer plate.

Second Maxillæ with narrow plates.

Maxillipeds with the shaft strong and bulky, the inner plates with a pointed apex; the outer plates more or less apically angular, without marginal spine-teeth, the palp with its third joint longest, its fourth very small or rudimentary.

First Gnathopods with the hands narrowing apically, not subchelate.

Second Gnathopods with the hand and finger forming a feeble chela.

Uropods short, those of the third pair with no more than a single tuberculiform ramus.

Telson short, whole or emarginate.

The generic name is derived from ἀκόντιον, a dart, στόμα, a mouth, in allusion to the shape of the upper lip, and to point to the connection between this genus and *Acidostoma* of Lilljeborg. Type species, *Acontiostoma marionis*.

By Boeck, as well as by Lilljeborg (see Note on Lilljeborg, 1865, p. 362), *Acidostoma* is said to be without palp on the first maxillæ; it has in fact a tubercle to represent this palp, which in *Acontiostoma*, though small, is more decidedly in evidence; in the new genus the spines of the outer plate are not abnormal in structure and position as in *Acidostoma*; the palp of the mandibles is short instead of long; in the palp of the maxillipeds the first joint is shorter instead of longer than the second; the third uropods are almost or quite without rami, and the telson, instead of being deeply cleft, is whole, or only a little emarginate.

Acontiostoma marionis, n. sp. (Pl. XXX.).

Animal compact, with a remarkably solid integument, opaque, speckled with roundish semi-transparent spots; the head totally concealed in a lateral view, in which the animal

has the appearance of a deep dish-cover; the first peræon-segment much longer than the second, forming in front a low narrow arch over the antennæ; behind it projects backwards with a rounded lobe beyond its own side-plate; the first three segments of the pleon with a sharp, very slightly elevated, dorsal carina on the distal end of each, the first two with the postero-lateral angles rounded, the third having them squared; the fourth segment with a dorsal depression, the afterpart with an elevated carina produced a little backwards; the two following segments very small.

Eyes comparatively large, oval, with the front margin somewhat flattened, situated near to the slightly convex medio-lateral margin of the head, dark, with the usual light rim.

Upper Antennæ.—First joint large, cylindrical, equalling in length the rest of the antenna; second joint almost as long as the flagellum, third narrower and rather shorter than the second; flagellum of seven short joints with stout cylinders, five or six on the first joint, which is not greatly longer than the second; secondary flagellum slender, of two joints, the first about as long as the first of the primary, the second minute.

Lower Antennæ.—The gland-cone very prominent, standing at right angles to the third joint; fourth joint much longer than the fifth, a little curved, and expanding a little distally, some setæ on the side and at the apex; fifth joint not quite so long as the tapering, seven-jointed flagellum.

Upper Lip broad at the base, centrally ridged, narrowing gradually at first, towards the end more abruptly, as if to end in a broadly rounded point; in our specimen the apex shows a serrate emargination, but whether this is normal or due to fracture I cannot say for certain; there is furring within and on either side of the apex, also the inner plate, which does not quite reach the apex of the outer, has its own rounded apex densely furred.

Mandibles very long and narrow and straight; the cutting edge smooth; the secondary plate of the left mandible not perceived, probably very small; spine-row of three or four small spines, followed by a long furry tract of cilia, the only representative of a molar tubercle; above is a projection corresponding apparently to the "articular condyle" of Schiødte, and to the part of the mandible of *Acidostoma obesum* which Lilljeborg, on *Lysianassa magellanica* (pl. v. fig. 56), calls the molar tubercle, but which from its position can scarcely have anything to do with that organ either in origin or function; far to the rear is placed the small three-jointed palp, the base of the mandible being a little dilated behind it; the first joint of the palp comparatively long, with one seta attached near the outer apex; the second joint with two pectinate setæ or spines at the outer apex; the third joint slender, curved, as long as the second, with numerous adpressed cilia, and at the apex two unequal pectinate spines.

Lower Lip strongly ciliated on the forward lobes, which are much narrowed distally; the mandibular processes also ciliated.

First Maxillæ.—Inner plate slender, with one spine-like seta on the apex; outer plate long, straight, apically bordered with eleven (?) dentate spines, the upper and outer very strongly toothed with few teeth, the lowest on the inner margin having nine to eleven lateral denticles; a little brush of cilia below the latter; the palp seemingly one-jointed, rising on the outer margin of the outer plate at a level with the top of the inner plate, and reaching with a smooth pointed apex nearly to the base of the outermost spines of the outer plate.

Second Maxillæ not well observed, both plates probably slender, apically narrowed, the inner rather shorter than the outer.

Maxillipeds.—The shaft large and strong; the inner plates narrowing distally, the outer margin rounded at the shoulder, and the apical running obliquely forwards and forming an elongate tooth on the inner side; two strong acute spines and a cilium are attached to the side of this tooth-like process; the outer plates of solid structure, reaching a long way beyond the inner, the inner margin unarmed but for a seta near the middle, the apex almost acute, the apical region, much of the hind margin, and a tract within the front margin covered with short cilia in regular rows; first joint of the palp small, with some long setæ at the inner apex; second joint shorter than the third, with some setæ on the inner and apical margins; third joint nearly straight, with setæ or spines on both margins, a group of six pairs near the inner apex; the fourth joint very short, its nail consisting of a small oval spine sheltered by a cap which the tip of the fourth joint forms for it; were the palp straightened, the third joint would reach beyond the outer plate.

First Gnathopods.—Side-plates massive, covered with scale-like markings, of nearly oblong shape, with the lower front angle rounded off. First joint not reaching the end of the side-plate, in length about equal to the next four joints, with setæ on its rather sinuous front margin; second joint stout except at the base, as long as the wrist; third joint very short, with five pairs of setæ on the hind margin; wrist shorter than the hand, but broader, fringed with setæ behind, and carrying them at two points in front; the hand long, widest near the base, then tapering slightly, fringed with setæ on the hind margin, groups at three points in front, no palm; the finger half the length of the hand, the nail curved, the inner margin of the finger peculiar in being set with four distinct spines at intervals.

Second Gnathopods.—The side-plates gently curved, long and narrow, furry on the middle part of the hinder margin. The first joint not reaching the end of the side-plate, a little dilated in its lower half, length fully equalling the third, fourth, and fifth joints outstretched together; the second joint longer than the wrist; the third joint short, but much longer than the third of the first pair, lightly furred on the very convex hind margin; the wrist a little longer than the hand, and stouter, furred with scales on both margins, and carrying one or two setæ on the hind apex; the hand elongate, widest

distally, much furred with scales, the hinder part produced beyond the front for the full length of the tiny finger; the apex of the front margin is occupied by a group of short pectinate spines or setæ, beyond which the finger is set and almost lost when closed in its close contact with the projecting part of the hand already mentioned.

First Peræopods.—The side-plates with straight hind margin, otherwise similar to those of the preceding segment, but broader and longer. The first joint attached lower down than in the two preceding pairs, very broad, not nearly reaching the end of the side-plate, carrying one group of setæ at the apex of the convex hinder margin; second joint subequal in length to the fourth; third joint as broad as the first, and not very much shorter, with setæ along the hind margin, and at the apex in front; fourth joint only half as broad, similarly armed; fifth joint much longer than fourth, but shorter than third, with seven spines along the hinder margin, that at the hinge of the finger being the largest, and having a smaller one in its company; the finger stout, with strongly curved nail, together about half the length of the fifth joint.

Second Peræopods.—Side-plates not very much longer or broader than those of preceding segment, excavation behind not wide but carried far down, the hind margin below it being directed slightly forwards, so that the plate is scarcely broader below than at the base. The first joint reaching little below the excavation, the second decidedly longer than the fourth, and with several setæ on the hind margin; the third joint of tolerably even width throughout, not greatly expanded below the base as in the preceding pair, which this in general resembles.

Third Peræopods.—The side-plates rather wider than deep, the front margin more convex than the hinder. The first joint broadly oval, with numerous setæ on the front margin, the hinder very shallowly crenulate, with small cilia in the pits; the second joint overlapped behind by the first, many setæ and half a dozen spines along its front border; the third joint greatly expanded and decurrent, with some twenty spines and a few setæ distributed on the front margin and apex; the hinder expansion is rhomboidal, the lower edge descending below the fourth joint, the hinder margin being serrate, and the apex carrying a spine; the small fourth joint has spines in front at two points on the margin and a group at the apex; the fifth joint is smaller than in the preceding pair, with spines at five points of the front margin; the finger like that of the preceding pair, with the dorsal cilium small, very near the base. A slender accessory vesicle belongs, I think, to the branchiæ of this pair.

Fourth Peræopods.—Side-plates with straight, almost parallel sides, the hinder lobe produced below the front one. The branchial vesicle small, descending little below the side-plate. The first joint larger than the side-plate, broader than deep, rounded, larger than the first joint of the preceding pair, the third joint also larger, but the general structure and armature of the limb similar.

Fifth Peræopods.—Side-plates with the hind margin nearly straight, much longer

than the front one. The first joint much larger than the side-plate, larger than the first joint of the preceding pair, longer than broad, widest below, the front margin unarmed in the upper part, the hind margin slightly crenulate, the lower margin overlapping the second joint, convex, smooth; the third joint decurrent, with spines on the inner side of the decurrent part, and a large one at the apex, this joint twice as wide as the small fourth joint which it overlaps, but without the wide expansion seen in the two preceding pairs; all the joints of this limb except the first are shorter than those of the fourth pair, the armature not very different.

Pleopods.—The peduncle short, almost as broad as long, coupling spines very small; outer rami with thirteen to fourteen joints, with eighteen plumose setæ on the first joint; the inner rami with eleven joints, the first joint broader at the base than its length, narrowed rather abruptly; the cleft spines three or four in number.

Uropods.—Peduncles of the first pair equal in length to the outer ramus, which is bordered with seven spines, and is longer than the inner, which has but two; each has a small indistinct nail; second pair shorter than the first, peduncles very stout, longer than the rami, outer ramus longer and stronger than the inner, with a row of four spines, the inner without spines, but like the outer tipped with a small nail; third pair in a lateral view presenting the appearance of an equilateral triangle, with spines round most of the upper side to the apex and without any perceptible rami.

Telson not much longer than broad, of the shape of half an egg, the apical part underneath set about with a collar of some eighteen spines, only those nearest the apex projecting beyond the margin, each spine carrying an accessory thread; an additional group of spines near the apex is placed within the collar.

Length.—The specimen in the position figured was three-tenths of an inch long, with a depth at the centre of rather more than two-tenths.

Locality.—Station 145, off Marion Island, December 27, 1873; depth, between 50 and 75 fathoms. One specimen; male (?). Dredged.

Remarks.—The specific name refers to the place of capture.

The species is distinguished from the others of the same genus by its much more considerable bulk, and the greater solidity of the integument. From *Acontiostoma magellanicum* it differs in numerous details of the armature of the joints and in some of the proportions, but resembles it in so many particulars that some doubt arises whether *Acontiostoma magellanicum* may not simply be the young of *Acontiostoma marionis*. They were, however, taken at Stations far apart; it is, moreover, in the smaller form that the mandibular spine-row appears to have the larger number of spines, and the maxilliped-palp to have the finger and nail most developed. Both these forms are distinguished from the other two species of the genus by the difference in the palp of the first maxillæ, as well as by the more developed finger of the maxilliped-palp.

Acontiostoma magellanicum, n. sp. (Pl. XXXI.).

Head almost entirely covered by the first peræon-segment and its side-plate; back round, animal compact; postero-lateral angles of the first two pleon-segments well rounded, of the third also rounded but forming almost right angles, with the lower margin straight; fourth segment with a dorsal depression followed by a small hump overhanging the very small fifth and sixth segments; on each of the first four segments a dorsal hair is visible.

Eyes small, visible through the transparent side-plate; each eye is composed of about fifteen comparatively large ocelli.

Upper Antennæ.—First joint twice as long as broad or longer; second joint nearly as broad but much shorter, third joint nearly as long as second, narrowing distally; flagellum of four very short joints, successively narrower but scarcely shorter; the first with two long stout cylinders, the second and third each with one; the fourth tipped with a tuft of setæ; secondary flagellum of two short joints.

Lower Antennæ not quite so long as the upper; gland-cone prominent, blunt-ended, third joint short, fourth longer than fifth, fifth almost as long as the small four-jointed flagellum; some spiniform setæ on the terminal joints of the flagellum, also at the base of the peduncle a curious parasitic growth, described below.

Mandibles of the same shape as those described in *Acontiostoma pepinii*, but here there is an undoubted secondary plate on the left mandible, small, strap-shaped, a little expanded distally; the spine-row consists of half a dozen small spines, followed by a long furry tract of short cilia; the setæ at the apex of the third joint of the palp have the parasitic growth.

Lower Lip with the forward lobes apically ciliated, very slightly dehiscent.

First Maxillæ.—Inner plate slender, tipped with a long, straight seta; outer plate long and narrow, with seven or eight dentate spines closely set on the apical margin, with a little group of cilia just below on the inner margin; the unarmed palp appears to be one-jointed, reaching with its point nearly to the base of the outer spines on the outer plate, a little constriction below the point giving it in some points of view the appearance of the nib of a pen; the curved inner spine of the outer plate has from nine to ten lateral denticles.

Second Maxillæ with both plates slender, the outer rather longer than the inner; each with eight or nine apical spines.

Maxillipeds.—Inner plates short, ending in a long tooth which just projects beyond the short first joint of the palp, and has a long seta fixed at its base; outer plates projecting beyond the second joint of the palp, inner border with a spine about midway, some others within the margin on the outer surface near the narrowed apex; the forward part of the hinder margin scarcely serrate; the third joint of the palp longer than the

second, followed by a small but very distinct finger, straight, tapering, ending in a sharp nail with cilia on either side. At the apices of the third and fourth joints of the palp are two or three setæ; on most of these the parasitic growth already alluded to is conspicuously displayed, the seta throughout its length being plumose with long, flexible cylinders, tapering distally, and presenting a minutely beaded appearance.

First Gnathopods.—Side-plates broad, rounded at the lower front angle, the cilium-carrying incision of the hinder angle raised a little above the lower margin. The first joint of the limb attached high up and only just reaching below the side-plate; the second joint as long as the wrist, the third very short; the wrist broader but much shorter than the hand; the hand tapering, with no palm; the finger curved, about half the length of the hand, with a spine on its inner partially pectinate margin near the nail. The second and third joints each have a long apical seta behind, the wrist has two, the hand has a row of three not so long, and two on the front apex, besides a cilium in the middle of the convex front margin. Many of the setæ have the anguilliform appendages.

Second Gnathopods.—Side-plates much narrower and not much deeper than those of the preceding segment; first joint not reaching to the end of the side-plate; second joint as long as the wrist; third shorter than the wrist, lightly furred on the very convex hind margin; wrist shorter than the hand, slightly furred on both margins; hand long, widest towards the distal end, furred on both sides, the marginal cilia having something of a scale-like appearance; the finger minute, as it were an equilateral triangle with a little hooked nail at the apex, this organ forming a tiny chela with the produced hind margin of the hand. There are no long spines or setæ upon these gnathopods, here and there a seta is found that might be called a cilium, except for the sake of distinguishing it from the neighbouring cilia with which some of the joints are furred; on the front apex of the hand the most important group consists of three or four straight and seemingly simple spines or setæ.

First Peræopods.—Side-plates similar to those of the preceding segment, but somewhat larger. The first joint not reaching to the end of the side-plate.

Second Peræopods similar to the first. Side-plates not very broad, the excavation behind slight, descending far down, the hind margin being then directed forwards, and being incised for a cilium just before meeting the lower margin; one of the minute cilia within the lower margin carries anguilliform appendages. The first joint rather broad, not long, not nearly reaching the lower end of the side-plate; the second joint longer than the fourth; the third broad, not decurrent, as long as the fifth, with one or two setæ on each margin; the fourth with one apical seta behind, and some microscopical scales on the breast; the fifth with its straight hind margin pectinate or squamose like the preceding joint, the convex front margin smooth, except for a seta at the apex, which on the other margin carries a spine; the finger stout, curved, with a strong nail.

Third Peræopods.—Side-plates broader than deep. First joint rounded, not so large as the side-plate, a spine and seta at the lower end of the front margin, a minute cilium high up on the hinder; the second joint with a seta followed by a spine on the lower part of the front margin, and some microscopic pectination between; the third joint broadly expanded, decurrent behind the fourth joint, with two spines on each border; the rest of the limb similar to that of the preceding pair.

Fourth Peræopods.—Side-plates with the convex hinder margin considerably longer than the straight front one. The first joint much larger than the side-plate. All the joints constructed as in the preceding pair, but somewhat larger, especially the first and third.

Fifth Peræopods.—Side-plates smaller than those of the preceding segment, hind margin not much longer than the front one. First joint a little larger than that of the preceding pair, the cilium of the hind margin lower down; third and following joints smaller than those of the adjoining pair.

Pleopods.—Peduncular spines two, perhaps more, the rami with four or five joints.

Uropods.—Peduncles of the first pair as long as the longer ramus, the rami short, pointed, the longer with one spine near the centre of its margin, the edges finely pectinate, the shorter ramus seemingly with smooth edges; the second pair smaller than the first, the peduncle about equal in length to the longer ramus, which has pectinate edges but no spine, the shorter ramus has a cilium near the base; no rami were discerned on the third pair.

The Telson appears to be short and broad with a small cleft or terminal emargination, having each apex capped by two spines, the outer one the larger, each carrying an accessory thread.

Length.—The specimen in the position figured measured rather over a tenth of an inch.

Locality.—Station 313, off Cape Virgins, Patagonia, January 20, 1876; lat. 52° 20′ S., long. 67° 39′ W.; depth, 55 fathoms; bottom, sand. One specimen. Trawled.

Remarks.—The specific name refers to the place of capture, at the entrance to the Strait of Magellan.

Acontiostoma pepinii, n. sp. (Pl. XXXII.).

A little, compact, hairy species; back of peræon well-rounded and broad, afterpart of pleon pinched in; the head almost covered by, though partially visible through, the semitransparent first peræon-segment and its side-plate; the fourth to the seventh peræon-segments deep; the third pleon-segment dorsally rounded, distally rising above the

fourth segment, which has a deep dorsal excavation, the end being strongly upturned, with the process rounded behind.

Eyes very small, components numerous, perhaps thirty.

Upper Antennæ.—Peduncle tumid, hairy above, the first joint as long as the rest of the antennæ, the second rather longer than the third; the flagellum of five joints, with a few cylinders, three or four on the first joint, which is shorter than the last of the peduncle; secondary flagellum of two short joints tipped with setæ.

Lower Antennæ.—Gland-cone moderately prominent, with squared apex, third joint short, fourth and fifth furred above, and carrying a few small setæ, the fourth joint longer than the fifth, the fifth as long as the four-jointed, rapidly tapering flagellum.

Upper Lip hairy.

Mandibles long and narrow, broadest at the base, cutting edge smoothly convex, with a tooth above and a denticulate point below, spine-row containing apparently seven spines in each mandible, unless the uppermost spine on the left mandible may be supposed to represent a secondary plate; the spine-row is followed immediately by a ciliated tract perhaps representing the molar tubercle, above which is placed the process which I regard as the equivalent of the articular condyle; the whole shaft is dotted with small cilia; far from the spine-row, close to the base, rises the small three-jointed palp, the first joint longer than usual, the third but little shorter than the second, tipped with two setæ, and having on the surface the customary adpressed cilia.

Lower Lip with the mandibular processes ciliated.

First Maxillæ.—Inner plate narrow, with a single short seta on the apex; outer plate elongate, crowned with eight closely-set dentate spines, the innermost showing eight lateral denticles; the palp minute, two-jointed, so placed on the outer margin of the outer plate that the tapering ciliated second joint projects a little beyond the apex of the inner plate.

Second Maxillæ.—The outer plates rather longer than the inner, both with long spines on the apices, the spines a little curved at the tips.

Maxillipeds.—The inner plates not much shorter than the outer, the apical margin running out furthest on the inner side, there carrying one or more teeth, followed by two long spines at intervals on the outer margin; the outer plate having a small spine or seta on the inner margin about one-third of its length from the base, a group of three setæ at two-thirds, two or three little nodules close to the apex, and the outer rim serrate or dentate for some distance down, lines or channels in the surface of the plate leading to the serrations; the first joint of the palp quite short, the second shorter than the third, with a cilium and a seta near the top of the inner margin; the third joint slenderer than the second, but as long as first and second combined, with an apical tuft of six or seven setæ, and perhaps a minute rudiment of a fourth joint; the palp forms an

obtuse angle where the third joint hinges on the second, and in this bent position scarcely overtops the outer plates.

First Gnathopods.—Side-plates widest at the centre, closely ciliated on the broadly rounded lower margin; first joint extending beyond the side-plate, nearly as long as the next four joints united; second joint longer than third, as long as the fourth, with two setæ on the hind margin; third joint very small, a little furred behind, with two setæ near the apex; the wrist broader but shorter than the hand, slightly furred behind, with two setæ in front at the apex and three at the back; the hand long, tapering, without a palm, finely pectinate along the hind margin, with seta-like spines at three points on that, and at two on the front margin; finger fully half as long as the hand, with a sharp, slender nail.

Second Gnathopods.—Side-plates oblong, and, like the preceding pair, furred, especially on the lower margin, besides carrying some stronger cilia. The first joint as long as the third, fourth, and fifth united; the second much longer than the third, subequal to the wrist; the short third joint with very convex hinder margin, carrying one cilium at a little distance from the apex; the wrist subequal in length to the hand, with six or seven scale-like cilia on the centre of the hind margin; the hand long, oval, finely furred almost all over, also with the squamose cilia on the lower two-thirds of the hind margin, which is produced considerably beyond the front margin, forming with the palm a triangular process against which the finger closes; the finger, which is backed by three or four setæ, is short and stout, the hooked nail, which forms more than a third of its length, not extending beyond the palm. On a diminutive scale the hand and finger form a feeble chela.

First Peræopods.—Side-plates similar to those of the preceding segment, but larger. The first joint broad, not reaching nearly to the end of the side-plate, shorter than the fourth and fifth joints united; third joint broad, not decurrent, much longer than the fourth, not quite so long as the fifth; the fourth joint short, hind margin straight, pectinate, with a spine and two cilia at the apex; fifth joint long, slightly tapering, hind margin nearly straight, pectinate, with acute spines at two points, and at the apex a pair of blunt spines curving towards the edge of the finger; the front margin of the hand convex, with one or two cilia; the finger strong, curved, with a very small dorsal cilium, and one or two cilia near the nail.

Second Peræopods.—Side-plates broader and deeper than the preceding pair, the excavation behind shallow, carried far down, the margin below it taking a forward direction to join the lower border, so that the upper and lower margins of the plate are of equal breadth; the joints of the limb similar to those in the preceding pair.

Third Peræopods.—Side-plates very broad and deep, with the breadth and depth subequal, rather deeper in front than behind. First joint irregularly rounded, two long setæ and a spine on the lower part of the furry front margin, the hind margin

carrying a cilium in a little emargination at the top; its rounded lower margin overlapping the next joint; the third joint much dilated, with spines at three points of the furry front margin, the convex hind margin so decurrent as to overlap not only the next joint but part also of the fifth; the fourth joint very short, a pair of spines at the apex in front; the fifth joint shorter than in the preceding pair, similarly formed, the pair of spines at the finger-hinge sharp instead of blunt; the finger as in the preceding pair.

Fourth Peræopods.—The side-plates with front and hind margins straight, lower margin roundly produced behind; first joint rounded, broader than deep, broader than the side-plate, an emargination with a cilium in the middle of the hind margin; third joint less decurrent than in the preceding pair, the limb in general similar.

Fifth Peræopods.—Side-plates small; first joint of the limb larger than in the preceding pair, a little wider than deep, front margin very convex, with several setæ on the lower part, the hind margin nearly straight, with a little cilium-bearing incision at the lower end, the convex lower margin very broad behind the second joint, which it overlaps; the third joint less expanded than in the two preceding pairs, the fifth joint shorter, with no spines on the front margin except the apical pair; the finger also shorter.

Pleopods.—A single cleft spine on the first joint of the inner ramus, which has four joints, while the outer has five. In the larger specimen mentioned below it was perceived that the peduncles of the pleopods carried two small spines, each with three retroverted teeth, the rami had six joints to the inner, eight to the outer, the first joint of the inner carrying two small cleft spines low down.

Uropods.—Peduncles of the first pair equal in length to the rami, the rami subequal, the inner with a small nail not reaching quite so far back as the outer; peduncles of the second shorter than those of the first, also about equal in length to the rami, of which the inner is a little shorter than the outer; peduncles of the third pair very short, the rami represented by a solitary tubercle, with a cilium at the apex.

Telson short and small; in the lateral view it is convex below and concave above, with strong spines and cilia about the apex.

Length.—The specimen in the position figured measured scarcely one-tenth of an inch; another specimen measured nearly three-twentieths.

Locality.—Station 149B, Royal Sound, Kerguelen, January 20, 1874; depth, 28 fathoms; bottom, volcanic mud. Three specimens.

Remarks.—The specific name is derived from Pepin, surnamed le Bref, the celebrated King of the Franks.

This species is distinguished from the following species, *Acontiostoma kerguelensi*, by its much firmer integument, its much greater hairiness, its much smaller eyes, the much smaller first joint to theflagellum of the upper antennæ, the more developed spines of the first maxillæ, the bulge in the front margin of the first side-plate, the

different armature of the first joints in the last three pairs of peræopods, the incision in the infero-posterior angle of the first joint in the last peræopods, and by the shorter and stouter first uropods.

Acontiostoma kergueleni, n. sp. (Pl. XXXIII.).

Head almost covered by the first peræon-segment and its side-plate; the postero-lateral angles of the first two pleon-segments well rounded, of the third more squared; these three segments a little hairy dorsally near the distal end; the third segment distally raised above the fourth, ending with a little upturned tip; the fourth segment with a deep dorsal depression, followed by an upturned process, the dorsal margin of which is hairy and faces forwards.

Eyes large, oval.

Upper Antennæ.—First joint broad, as long as the two following and first of the flagellum united, second joint broad, not long, third short, not broad; flagellum rapidly tapering, of five joints, of which the first is the longest, with a brush of very long cylinders; the following joints except the last also have cylinders; secondary flagellum of two small joints, together not equalling the first of the primary.

Lower Antennæ.—Gland-cone fairly prominent, with blunt apex, third joint very short, fourth longer than fifth, with some feathered cilia on the side, fifth as long as the four joints of the short, slender flagellum united.

Upper Lip a long, triangular plate.

Mandibles.—A prominent tooth at the upper part of the cutting edge; the secondary plate of the left mandible small, deeply bifid; spine-row not clearly made out, seemingly of two or three minute spines; no molar tubercle of any kind perceived; palp set close to the base, the first not very short joint rising from a process which gives the palp a four-jointed look; second joint with one spine near the inner margin far from the apex; third joint very nearly as long as the second, with a constriction near the base, adpressed cilia on the surface, two plumose setæ at apex. The secondary plate (seen through the semitransparent trunk) of the left mandible is drawn in the right hand figure on the Plate, the outside of the mandible being here given instead of the inside.

Lower Lip.—The forward lobes seem to be very slightly ciliated and not very dehiscent.

First Maxillæ.—Inner plate narrowing distally, with one small seta at the apex; outer plate long, apically capped with very short spines, probably denticulate; a minute two-jointed palp on the outer margin some way below the apex.

Second Maxillæ.—Inner plate a little shorter than the outer, each with about half-a-dozen spines or setæ on the apex.

Maxillipeds.—The inner plate long, reaching beyond the second joint of the palp,

to a pointed or bifid apex, with two spines on the outer margin; outer plates rather longer than the inner, with a small seta at about one-third of the length of the inner margin from the base, and two larger at about two-thirds; the apex almost pointed, spinules at intervals on the slightly serrate outer margin. First joint of the palp the same width as the second, with one small seta on the inner margin; the second with a small one, followed by a larger on the inner margin not far from the apex; the third joint more slender, rather longer than the second, furred, apically tipped with four or five setæ, and carrying one or two on the inner margin below the apex; perhaps a minute rudiment of a finger.

First Gnathopods.—Side-plates not very broad, incision for cilium on the hind margin a little above the rounded lower margin. First joint reaching a little below the side-plate; second joint rather longer than the wrist, with setæ at two points on the hind margin; third joint minutely furred behind, with one apical seta; wrist broader, but much shorter than the hand, furred behind, with one apical seta; hand tapering, without palm, carrying spines or setæ at five points on the hinder minutely pectinate margin, the front margin having two or three cilia; the finger more than half the length of the hand, slender, with a slender nail.

Second Gnathopods.—Side-plates narrower, a little longer than those of the preceding segment. The branchial vesicles as long as the first joint of the limb, which reaches below the side-plate, and about equals in length the third, fourth, and fifth united; the second joint as long as the hand, not quite so long as the wrist; the third joint short, but longer than the third joint of the first gnathopods; the wrist furred, without spines or setæ; the hand elongate, widening a little towards the apex, furred, carrying scale-like cilia on the breast; the apex of the front margin carries three or four spines over-arching the minute finger, this being a small triangle with hooked nail at the apex, which antagonizes with the produced front portion of the hand, thus forming a feeble chela.

First Peræopods.—Side-plates narrow, similar to those of the preceding segment. First joint not reaching the lower margin of the side-plate; third joint broad, as long as the fifth, not decurrent, with a seta on the hinder margin, and an apical seta or spine on the front; fourth joint a little broader but much shorter than the fifth, hind margin pectinate and apically carrying a spine, a cilium, and a setiform spine; fifth joint scarcely tapering, hind margin pectinate, carrying at two points short acute spines, and at the hinge of the finger a pair of blunt curved ones; finger more than half the length of the fifth joint.

Second Peræopods.—Side-plates longer and somewhat broader than those of the preceding segment, the excavation behind not broad but carried far down, the margin below it bending forwards. The branchial vesicles simple, much longer than broad. The joints of the limb similar to those of the preceding pair.

Third Peræopods.—Side-plates subequal in breadth and depth, large, the front lobe descending a little below the hinder one. The first joint smaller than the side-plate, rounded; on the lower part of the front margin setæ at three points, the lowest accompanied by an apical spine, the hind margin smoothly rounded but for two or three minute cilia near the top; two or three spinules on the front of the second joint; third joint much expanded, and decurrent on both sides of the fourth joint, four spines at four points in front, and at three behind, the two upper ones behind being minute; a group of three spines on the front apex of the short fourth joint; the fifth joint much longer than the fourth, with one spine at the centre, two at the hinge of the finger; finger more than half the length of the hand, with a curved nail; the front margin of the fourth and fifth joints is fringed with rows of minute spinules or prickles.

Fourth Peræopods.—Side-plates squarish, hind margin longer than the front. First joint a little larger than the side-plate, rounded, the lower part of the front margin with setæ at three or four points, followed by an apical spine, four cilia on the upper half of the hind margin; the other joints much as in the preceding pair, but with the fringing spinules much larger on the fourth joint, and less continuous on the fifth.

Fifth Peræopods.—Hind margin of the side-plates much longer than the front. First joint larger than in the preceding pair, front margin nearly straight, with several cilia along the lower part, the hind margin with two cilium-bearing indents at the lower end; the surface, as in the corresponding joint of the two preceding pairs, is downy; the third joint is less expanded but equally decurrent, with a spine on the inner side of the decurrent part; the fifth joint, pectinate on both margins, has a cilium at the centre of the hinder margin.

Pleopods.—Peduncles short, coupling spines two, with three or four retroverted teeth on one edge and two on the other; cleft spines on the inner ramus two to three, the two divisions of the cleft part of equal length; the joints of the inner rami from five to six, of the outer from seven to eight in number.

Uropods.—Peduncles of the first pair equal in length to the longer ramus; the rami stiliform, the lower the longer, each with a spine on the margin at some distance from the apex; the second pair much shorter than the first, peduncles as long as the lower longer ramus, the rami finely pectinate; the third pair very short, with a tubercular ramus.

Telson extending beyond the third uropods, short, narrowing distally, with an emargination of about a quarter of its length, rather deeper than wide, the apices tipped with spines.

Length of the specimen in the position figured, from the front of the head to the end of the third pleon-segment, three-twentieths of an inch.

Locality.—Station 149D, Royal Sound, Kerguelen, January 20, 1874; depth, 28 fathoms; bottom, volcanic mud. One specimen. Dredged.

Remarks.—The specific name refers to the place of capture. The numerous differences between this species and *Acontiostoma pepinii* have been already mentioned, but it is rather remarkable that two species of a new genus should have been taken at the same time and place, represented by specimens of the same size and resembling one another in so many particulars.

Family Valettidæ, n. fam.

Mandibles.—The cutting edge strongly dentate; a secondary plate only on the left mandible; molar tubercle prominent; palp three-jointed; articular condyle wanting.

First Maxillæ.—Spines of the outer plate fewer than eleven; the palp two-jointed.

Maxillipeds.—The inner plates with more than three apical spine-teeth.

Upper Antennæ.—The peduncle short and stout, the second and third joints very short, the first joint of the flagellum long, carrying a large brush of cylindrical filaments; a secondary flagellum present.

Second Gnathopods subchelate, slightly weaker than the first.

The body and side-plates not deep.

Peræopods of the last three pairs with the first joints not overlapping.

Remark.—In establishing a new family for a single genus containing a single species, the choice of characters must be to a certain extent arbitrary; in the above definition it is the combination of the forms there described for the mandibles and the upper antennæ that may be regarded as the most essential part.

Genus *Valettia*, n. gen.

First Maxillæ with the inner plate carrying more than two plumose setæ.

Second Maxillæ with the plates short, not narrow.

Maxillipeds with the inner margin of the outer plates almost smooth, apically produced; palp four-jointed, second joint not longer than the first.

Gnathopods of the first and second pairs similar, subchelate, both with strong oblong hands and definite palms.

Uropods biramous, successively shorter; the upper ramus in each pair shorter than the under.

Telson short and broad, partially cleft.

The generic name is chosen in compliment to the Baron Adolphe de la Valette, who early displayed his acuteness as a naturalist in investigating Amphipoda.

By its antennæ and pleon this genus might belong to the Lysianassidæ of Boeck. The mandibles would rather place it among the Pontoporidæ, but that

the right mandible, as in the Lysianassidæ, is without an accessory plate. From both of these groups it seems to be set far apart by the firm and definite structure of the hand and nail in the second gnathopods, and by the general shallowness of the body and side-plates.

Valettia coheres, n. sp. (Pl. XXXIV.).

Rostrum rudimentary; back round, but not broad; postero-lateral angles of the third pleon-segment acute, a little upturned; fourth pleon-segment with a dorsal depression, followed by a small distal hump; sixth segment dorsally ridged on either side of the telson. The commissures of the ganglionic chain stand distinctly apart; the ganglia have at each corner a globular packet of cells.

Eyes not observed.

Upper Antennæ.—Peduncle tumid, barrel-like, first joint scarcely longer than broad, but much longer than the other two united, both of these being short, but broad; the flagellum of thirteen joints in one of the pair, of fourteen in the other; the first joint subequal in length to the peduncle, tapering, with a brush of cylinders in numerous rows, the small joints that follow varying in length irregularly; the secondary flagellum slender, of four joints, which reach to the end of the second of the primary, the first of the four equalling in length the other three united.

Lower Antennæ subequal in length to the upper; first joint broad; gland-cone of the second joint prominent, acute; third joint short, fourth joint as long as the preceding three united, longer and stouter than the fifth, with setæ along the upper edge and a tuft at the lower distal angle; the fifth joint about as long as the first three of the fourteen joints of the flagellum, which, as in the upper antennæ, vary in length irregularly.

Upper Lip.—Viewed laterally, two distal lobes are seen, one set with small prickles, the other having a prominent tuft of cilia; between the two lobes a curved margin descends, which is also fringed with minute cilia.

Mandibles short, with a broad shaft, cutting edge narrowly produced, not convex, but divided into five sharp teeth of unequal size; secondary plate of the left mandible elongate, projecting nearly as far as the cutting edge, similarly divided into teeth, the longest tooth being slightly curved backwards; spine-row of four short spines, of which the first on the left mandible is bifurcate; molar tubercle prominent, the crown more or less dentate, with seven or eight spine-like cilia at the back and a long plumose seta; the palp set well forward, just over the molar tubercle, the first joint short, the second stout, very little longer than the third, with twelve spines on the upper part of the inner margin, the third joint distally pointed, with twelve spines on the upper part of the inner margin, most of them smaller than those of the second joint. I can find no

trace of a secondary plate on the right mandible, nor any trace of an articular condyle on either.

Lower Lip, seemingly very short, not strongly ciliated, but with a strong tuft of cilia at the apex of the forward lobes; the mandibular processes unusually broad.

First Maxillæ.—Inner plate short, irregularly oval, with five plumose setæ of no great length on the apical border; outer plate oblong, of no great length, the apical border almost straight, with eight (or ? nine) slender, slightly curved spines, no one of which seems to have more than two lateral denticles, the denticles being minute; the long second joint of the palp over-arching the outer plate, with six spine-teeth on the apical margin, the outermost one or two being considerably the longest; there are besides one or two spiny cilia on the inner side.

Second Maxillæ short and rather broad, the inner plate with curved spines and plumose setæ, about a dozen in all, passing from the apex half-way down the inner margin; the outer plate but little overtopping the inner, its inner margin straight, its apical margin carrying a dozen spines of various sizes, curved at the tips.

Maxillipeds.—The broad prismatic inner plates not reaching quite so far as the apex of the first joint of the palp; the plumose setæ beginning high up on the inner margin; the apical margin most advanced centrally, carrying five not closely-set spine-teeth on the inner slope and some elongate slender spines on the outer, also one or two spine-teeth just below the apex on the inner margin; outer plates extending beyond the second joint of the palp, inner margin almost unarmed, but apically produced into a long acute process, at the base of which on the outer side is a small cilium, followed some way further down the outer margin by a single long, feathered spine; within the inner margin are some small spines, not visible in the figure because they are on the outer surface; the second joint of the palp not longer than the first, the third not longer than the fourth; the first, second, and third with setæ only on the apices, the fourth with a distinct nail.

First Gnathopods.—Side-plates short and broad, much rounded in front, not reaching to cover the base of the lower antennæ. First joint of the limb projecting much beyond the side-plate, broad, widening below, the front margin straight, the hinder convex, with long, distally plumose setæ on both margins; the second joint broader than the third, and as long or longer, with pectinate spines at the apex; the third with no free front margin, distally acute, hind margin bent, the lower part bordered with pectinate spines; the wrist not as long as the hand, becoming very broad distally, where it has pectinate spines before and behind; the hand broad, with front margin convex, longer than the straight hind margin, some pectinate spines on both, and a few short ones on the inner surface; the palm rather deeply concave, defined by a large and a small spine and some cilia at the projecting end of the hind margin; the finger not massive, long enough to reach the end of the palm; some cilia near the origin of the nail on the inner margin, the dorsal cilium small, placed near the hinge.

Second Gnathopods very similar in general character to the first. Side-plates rather longer than those of the preceding segment, with three small spines on the margin just above the cilium of the lower hinder angle. The branchial vesicles expanding at once from the neck and continuing of nearly equal breadth to the lower, almost straight margin. First, second, and third joints as in the preceding pair, except that the first and second are somewhat longer and narrower; the wrist is here longer than the hand, and the distal half wider, with some spines on the hind margin as well as at the apex; the hand oblong, front margin a little convex, hind a little sinuous, with pectinate spines on the lower part; the palm sloping somewhat inwards, defined as in the previous pair, not concave, but with an irregularly crenate margin, which the finger would apparently a little overlap.

First Peræopods.—Side-plates broad, most so at the centre, the front margin convex. The first joint reaching beyond the side-plate, broadest distally, with setæ on both margins, of which the front is concave, the hinder convex; third joint much longer than the fourth, broad, very slightly decurrent, spines at six points on the hind margin, at two in front; fourth joint shorter and broader than fifth, with a few spines on the back margin, and an apical tuft in front; fifth joint tapering a little distally, slightly armed on the straight hind margin, and having some spines at, and a little way above, the apex in front; finger short, the sharp nail forming a large part of its length.

Second Peræopods.—Side-plates with length and breadth equal, very slightly excavate behind. The joints of the limb similar to those of the preceding pair.

Third Peræopods.—Side-plates much wider than deep, the hind lobe descending rather lower than the front, and carrying two or three spines. Branchial vesicles a long oval, standing out from the narrow neck at the top. First joint a narrow oval, smaller than the branchial vesicle, with spines on the lower half of the front margin, the hind margin showing only two notches, not expanded below; the four following joints with spines on the front margin; the third joint broader than the fourth, subequal in length, with spines behind at two points; fourth joint broader than fifth, slightly longer, with spinules behind; the fifth joint straight; the finger small and slender, not nearly half as long as the fifth joint, the nail short.

Fourth Peræopods.—Side-plates similar to those of the preceding segment, but on a smaller scale. Branchial vesicles similar in shape to those of the preceding segment, but smaller, and, instead of descending, being directed abruptly forward, a fold starting from the neck, as if to form a small accessory sac, reunites with the main vesicle. First joint longer than in the preceding pair, front margin straighter, with more spines, a seta near the base, hind margin notched at five points; the rest of the limb similar to the preceding, but all parts longer except the finger, and the third and fourth joints decidedly longer than the fifth.

Fifth Peræopods.—Side-plates not bilobed. Branchial vesicles small, twisted upwards

and backwards. First joint with the front margin very straight, carrying two setæ or cilia above and a few spines along its course, behind much expanded, serrate, narrowing below and not overlapping the next joint; the third joint a little shorter than in the preceding pair, the rest similar. Owing to the comparative narrowness of the first joints in the third and fourth peræopods, and the breadth of the side-plates to which they are attached, the third, fourth, and fifth peræopods stand well apart, instead of overlapping above, as they so commonly do.

Pleopods.—The peduncles powerful, with some setæ, and four very slender coupling spines in which the retroverted teeth are small, seemingly three or four in number; the cleft spines are three in number, placed high up on the long first joint of the inner ramus; the joints of the inner ramus number thirteen, those of the outer fifteen.

Uropods.—The peduncles of the first pair longer than the rami, the rami unequal, the lower with more spines and longer than the upper; the peduncles of the second pair equal to the shorter ramus in length; peduncles of the third pair shorter than the rami, which are short and broad, armed with a few cilia-like spines, pectinate on the edges like those of the other two pairs, the lower longer ramus with a nail.

Telson extending a little beyond the peduncles of the third uropods, not much longer than its breadth at the base, cleft rather beyond the centre, not dehiscent, with one or two cilia on each rather broad rounded apex, and one or two on the lateral margins lower down than the top of the cleft.

Length of the outstretched specimen, without the antennæ, half an inch.

Locality.—Station 156, Antarctic Ocean, February 26, 1874; lat. 62° 26′ S., long. 95° 44′ E.; depth, 1975 fathoms; bottom, Diatom ooze. One specimen. Trawled.

Remarks.—It seems not inconsistent with the great depth from which this species is reported to have been obtained that it should exhibit some striking peculiarities. The specific name, *coheres*, intimates that it has gone shares with various groups in the inheritance of its characters, as already explained in the note upon the generic description. The outer plates of the maxillipeds are very remarkable, and so also is the absence of the accessory plate on the right mandible in combination with the character of a strongly dentate cutting edge. As the observations are based upon a single specimen, however, it is necessary to allow for the possibility of the plate being accidentally absent, though there is no appearance in the specimen of any such loss.

Family Stegocephalidæ, G. O. Sars, 1882.

Dana in 1852 makes the Stegocephalinæ a subfamily of the family Gammaridæ; Boeck in 1876 makes them a subfamily of the Leucothoidæ; Sars in 1882 makes them an independent family. Boeck gives the following definition:—

"*Hypostome* produced.

"*Upper Lip* broad, cleft at the apex; the lobes of unequal length.

"*Mandibles* elongate, without molar tubercle or palp, apically very broad, much or little dentate, not a uniform pair; the left mandible having an accessory plate.

"*Lower Lip* narrow, elongate, without inner plates, but furnished at the apex with a dentate appendage (articulo appendiculari).

"*First Maxillæ* very broad; outer plate apically furnished with strong but simple spines (ungvibus); palp one- or two-jointed; inner plate very broad, very setose.

"*Second Maxillæ* with the inner plate very broad, the outer narrow or very small.

"*Maxillipeds* with very broad plates; the outer plate furnished with weak teeth or only serrate; the palps slender, narrow; the last joint of the palp unguiform.

"Body very deep, but thick. Four anterior side-plates much increasing in size (successively); the fourth side-plate very large. The head very short, but deep.

"*Antennæ* short, but robust; the upper with a small secondary appendage; the first joint of the flagellum elongate and thick.

"*First* and *Second Gnathopods* almost of the same shape and size, scarcely subchelate.

"*Third* and *Fourth Peræopods* with the first joint little or not at all dilated.

"*Fifth Peræopods* shorter than the preceding; the first joint much dilated and elongate.

"The *Uropods* each furnished with two cylindrical rami.

"*Telson* little, sometimes slightly cleft."

Genus *Stegocephalus*,[1] Krøyer, 1842.

Stegocephalus inflatus, Krøyer (Pl. CXXXVII. A).

1774. *Cancer ampulla*, Phipps, Voyage towards the North Pole, p. 191, Tab. xii. fig. 3.
1781. *Gammarus ampulla*, J. C. Fabricius, Species Insectorum.
1787. „ „ J. C. Fabricius, Mantissa Insectorum, tom. i.
1788. *Cancer* (*Gammarus*) *ampulla*, Gmelin, Linnæi Systema Naturæ, t. i. p. v. p. 2991.
1791. *Gammarus ampulla*, Olivier, Hist. Nat. Insectes, t. vi.
1793. „ „ J. C. Fabricius, Entom. Syst., t. ii.
1796. *Cancer gammarellus ampulla*, Herbst, Krabben u. Krebse, ii. No. 61, pl. 35, fig. 1.
1802. *Cancer Gammarus ampulla*, Turton, Translation of Gmelin's Linnæus.
1802. *Gammarus ampulla*, Bosc, Hist. Nat. Crust, t. ii. p. 146.
1803. „ „ Latreille, Histoire Naturelle, vol. vi.
1818. „ „ Latreille, Tableau Encyclopédique, pl. 348, figs. 1, 2, 3.
1820. *Cancer ampulla*, Scoresby, An Account of the Arctic Regions.
1821. *Gammarus ampulla*, Sabine, Appendix to Parry's Voyage, p. 51.
1824. „ „ Sabine, Supplement to Parry's Voyage, p. ccxxix.
1828. „ „ J. C. Ross, Appendix to Parry's Narrative, p. 204.
1835. „ „ Owen, Appendix to Sir J. Ross's Second Voyage.

[1] For the original definition of this genus, see Note on Krøyer, 1842 (p. 198).

1840. *Lysianassa* (?) *ampulla*, Milne-Edwards, Hist. des Crust., iii. p. 22.
1842. *Stegocephalus inflatus*, Krøyer, Naturh. Tidsskr., B. iv. H. 2, p. 150.
1845. „ „ Krøyer, Naturh. Tidsskr., R. 2, B. i. pp. 522–530, t. vii. figs. 3*a*–3*g*.
1846. (?) „ „ Krøyer, Voy. en Scandinavie, pl. 20, fig. 2, *a*–*t*.
1852. „ „ White, Appendix to Sutherland's Journal.
1855. *Stegocephalus ampulla*, Bell and Westwood, The Last of the Arctic Voyages, p. 406, pl. xxxv. fig. 1.
1859. *Stegocephalus inflatus*, Bruzelius, Skand. Amph. Gammaridea, p. 38.
1862. *Stegocephalus ampulla*, Sp. Bate, Brit. Mus. Catal. Amph. Crust., p. 63, pl. x. fig. 2.
1865. „ „ Goës, Crust. Amph. maris Spetsb. (two forms), p. 5 (521), figs. 8, 9.
1869. „ „ Norman, Last Report on Dredging among the Shetland Isles, p. 276.
1870. „ „ Boeck, Crust. Amph. bor. et arct., p. 48.
1876. „ „ Boeck, De Skand. og Arkt. Amph., p. 421.
1886. „ „ Koelbel, Crust., Pycn., Arach. von Jan Mayen, p. 5.
1887. „ „ Hansen, Dijmphna-Togtets zool.-botan. Udbytte, p. 218, Tab. xxi. figs. 10–10*c*.

Locality.—Station 49, south of Halifax, Nova Scotia, May 20, 1873; lat. 43° 3′ N., long. 63° 39′ W.; depth, 85 fathoms; bottom, gravel, stones; bottom temperature, 35°. Two specimens, the larger a female, nearly three-quarters of an inch long. Dredged. Colour as in Voy. en Scand., pl. 20, fig. 2.

Remarks.—Commenting on specimens from the Kara Sea, many of which were distinguished for their size, one being 47 mm. long, Dr. Hansen (*loc. cit.*) observes, "the species is easy to distinguish from the *Steg. Kessleri* figured by Stuxberg (Vega B. I., p. 713), which last pretty certainly is the same as the 'forma altera' of *Steg. ampulla*, established by Goes (*Op. cit.*, p. 521, Fig. 9). Specimens of *Steg. ampulla* have the fourth pair of side-plates deeper than long, and the fifth peræopods' expanded second joint (first joint, auctorum) ending in a right, or even slightly acute, angle. Young, taken from the pouch of the female and sufficiently developed to leave it, are distinguished by the circumstance that the fifth peræopods' second joint has its expanded plate prolonged somewhat downwards and evenly rounded, and the side-plates of the third pleon-segment rounded below; they are, however, easily distinguishable from *Steg. christianensis*, Boeck, in that the fourth peræopods' second (Boeck's first) joint is expanded, and from the species described by Sars by the fourth pair of side-plates, which are quite like those of the adult (see above), and by several other points, which are easily seen in Sars' figures." A footnote already quoted (p. 599) explains that Dr. Hansen's specimens ought to have been described as *Stegocephalus inflatus*, Krøyer, and that "*Stegocephalus Kessleri*, Stuxberg," is the true synonym of *Cancer ampulla*, Phipps.[1]

[1] Since Phipps' specimens (*uncialia et biuncialia*) were as large as Dr. Hansen's, I do not know why Dr. Hansen refers to the size as a distinction between the two species. Phipps may have had both forms, for his account of the last peræopods (*femora postremi paris postice acuta*) scarcely agrees with the figure. In the synonymy given above the references to Krøyer, Hansen, and Goës (fig. 8) clearly refer to *Stegocephalus inflatus;* in most of the others the name *ampulla* has doubtless been used without knowledge of the distinctions which Dr. Hansen draws between the forms *ampulla* and *inflatus*.

Genus *Andania*, Boeck, 1870.

Mandibles with the cutting edge for the most part smooth; only one mandible with a secondary plate, and that minute.

First Maxillæ with a two-jointed palp, which does not always reach so far as the outer plate.

Second Maxillæ with the outer plate shorter and much narrower than the inner.

Telson very small, whole or slightly incised.

Boeck founded this genus for the two species *Andania abyssi* and *Andania nordlandica;* to these Sars in 1882 added a third, *Andania pectinata;*[1] for the three new species now included, it has been necessary slightly to modify the wording of Boeck's definition (see p. 399). Indeed, his expression, "Maxillæ 1mi paris palpo elongato, lato, 2-articulato," does not seem to agree with his description of the first maxillæ of *Andania nordlandica*, of which he says, "Palpen er liden, uden Borster."

Andania gigantea, Stebbing (Pl. XXXV.).

1883. *Andania gigantea*, Stebbing, Ann. and Mag. Nat. Hist., ser. 5, vol. xi. p. 206.

The head almost concealed beneath the large overhanging first segment of the peræon, the forehead obtusely angled; the peræon broad and deep, especially from the second to the fifth segment; the first segment longer than the rest, from before backwards increasing rapidly in depth; from the sixth segment of the peræon the width and depth of the segments decrease rapidly towards the telson; the segments of the pleon not exceeding the average length of those of the peræon, the third segment with the rounded hind margin dorsally produced over the dorsal depression of the fourth segment, the sixth segment dorsally emarginate to receive the telson; the postero-lateral angles acute in the second segment, but not in the first, and scarcely in the third, though in that segment a little outdrawn. In spirit the integument shows prismatic colouring. The larger specimen is brown and very thin-skinned, while the smaller has a less flexible integument, and, as is commonly the case with specimens in spirits, is a sort of creamy-white in colour.

Eyes not made out, probably wanting.

Upper Antennæ.—The first joint stout and short, broader than long; the second joint a little narrower and much shorter; the third showing little more than a rounded lobe on each side, the smaller lobe on the inner side having a group of setæ; the flagellum three-sided, tapering, of about fourteen joints, of which the first is very large, much longer than either the peduncle or the remainder of the flagellum; it tapers strongly with a slight curve, and in addition to a row of nine or ten large spine-like setæ along

[1] In regard to this, see Note on Aurivillius, 1885 (p. 558).

its surface, its lower side carries a brush of long hairs or cylinders, consisting of some seventy rows; the remaining joints are short, especially the earlier ones; in a groove on the inner side of the first joint lies the narrow ribbon-like accessory flagellum, consisting of one very long joint and two minute terminal joints, the terminal spines or setæ reaching to the end of the first joint of the primary.

Lower Antennæ.—The first three joints very short, the first somewhat inflated, the gland-cone of the second small; the fourth joint between two and three times as long as broad, three-sided, with several groups of spines along one side; the fifth joint much longer and thinner than the fourth, three-sided, rather wider at each end than in the middle; the flagellum longer than that of the upper antennæ, shorter than the peduncle, consisting of twenty-five joints, of which the first is the longest.

The Epistome carinate; the distal lobes of the upper lip slightly unsymmetrical. In fig. C the upper lip is seen just above the cutting edges of the mandibles, which are in close juxtaposition; the flagella of the lower antennæ, and the terminal portions of those of the upper, are omitted; the first pair of side-plates are seen in profile.

Mandibles.—Cutting edge broad, almost straight, but with a little convexity, having a denticle at the upper end (the lower end in fig. C) with a small tooth on the upper margin just behind it; at the lower end the margin is produced rather into a small tooth-process than a tooth, the lower margin being finely denticulate nearly as far as the base of the secondary plate; this is found only on one mandible, as far as I could judge on the right, not on the left, mandible; it lies along the lower side of the principal plate, is much longer than broad, and has the distal edge denticulate with about ten closely set denticles, together with three or four on the lower edge; the neighbouring tract of the principal plate shows some ciliation; and beyond this the lower margin runs out to an obtuse angle, apart from which the mandible would have the figure of a parallelogram; the angle or projection perhaps represents the otherwise absent molar tubercle. In the Plate, figures *m.m.*, the outside surfaces of the mandibles are represented, the right mandible being on the left hand, with the secondary plate seen through the transparent trunk; the curved depression in the corresponding part of the left mandible is likewise seen through from the inner surface.

Lower Lip.—The front lobes broad, widely dehiscent, strongly ciliated on the outer margin, less so on the flattened distal margin, and the inner margin smooth; across each plate from the outer margin to near the centre of the base runs a curved line of short, stiff bristles, which at either end of the line are very numerous; the mandibular processes are not flat but form a fold with the hollow inwards, the distal end rounded.

First Maxillæ.—Inner plates very large, the inner margin fringed with about thirty strong plumose setæ; the truncate distal margin of the outer plate is armed with six larger and three smaller spines, variously, but none strongly, denticulate, with numerous spine-like cilia about their bases; the palp has a few spines at the apex of the indistinctly

articulated first joint, and very many long slightly feathered spines on the serrate margins of the triangular apex of the second joint, which scarcely reaches the bases of the spines of the outer plate.

Second Maxillæ.—The inner plate rather longer than the outer and immensely broader, especially at the base, from which it narrows gradually to the apex; the inner margin armed with about thirty-six long, spine-like, plumose setæ, the tips unfeathered, and a parallel row of some twenty shorter spines, with the distal portion denticulate; these spines increase in length as they approach the apex, where there are some long spines, plumose below, denticulate above; the outer plate, of tolerably even width throughout, has many large spines on the apex, slightly denticulate, and a few slender and setiform at the tip of the inner margin.

Maxillipeds.—The inner plates greatly inflated, not reaching so far as the distal end of the first joint of the palp; the inner margins convex, distally dehiscent, fringed with long minutely feathered spines rather than setæ, the series passing round to the outer distal angle, where the flattened distal margin carries a thin spine bending over two little straight spinules; some way down the outer margin there are two strong spines; the outer plates narrow, not reaching the distal end of the second joint of the palp, armed along the serrate inner and distal margins with long slender spines, of which there are groups also on the outer surface near the inner margin; first joint of the palp subequal in length to the second; both armed on the inner margin, the second also on the outer apex, with long slender spines; the third joint much shorter than the second, very slender, with slender spines along the inner margin and about the apex, one or two of the latter longer than the finger; the finger thin and nail-like, with a very small dorsal cilium at a fourth of the finger's length from the base.

First Gnathopods.—The side-plates small, almost triangular, with the free margin a little curved. The first joint about as long as the next four joints united, the front margin straight, fringed with setæ, the hinder a little sinuous, with many very long slightly plumose setæ on or near it; the second joint short, with plumose setæ at the hinder apex; the third joint with plumose setæ at two points of the hind margin, and along the distal border, which forms a pointed apex in front; the wrist is longer than the hand and distally broader, with several strong spines on the hinder margin, as well as groups of setæ here and on both surfaces, and at the apex of the front margin; the hand tapers much towards the distal end; the serrate hind margin is nearly straight, carrying ten or eleven groups of long spines and setæ, and several groups of long setæ also on the surface and on the front margin, the distal part of which is serrate; the finger is small and slender, about half the length of the hand, at the apex of which it is fixed, having no palm to close against, the long spines and stiff setæ of the hind margin perhaps for some purposes serving instead of a palm.

Second Gnathopods.—Side-plates parallel-sided, the lower margin continuing the

curve of the preceding pair. The branchial vesicles, here and throughout, broad and inflated; this pair about as long as the first joint. The limb very similar to that of the first gnathopods; the first joint a little shorter, and at the top a little narrower; the third, fourth, and fifth joints rather longer, the fourth and fifth slightly narrower, subequal to one another in length; the armature similar.

First Peræopods.—Side-plates similar to the preceding pair, but rather longer and broader, in each pair the front margin a little convex, and the hinder a little concave. Limb as in the next pair.

Second Peræopods.—Side-plates scarcely longer than the preceding pair, but below the excavation equal in breadth to the two preceding pairs, the lower margin continuous with theirs, the hind margin rounded below the excavation. The first joint about the same size as that of the second gnathopod; short feathered setæ along the front margin, numerous long ones on the lower part of both margins; the short second joint having the lower half of the hind margin and its apex crowded with them; the third joint nearly as long as the first, with a group of long setæ on the slightly decurrent apex of the front margin, the hind margin straight, slightly serrate, fringed with numerous setæ; the fourth joint subequal in length to the fifth, the apical group of the front margin shorter than in the third joint, with a small group a little higher up, the hind margin rather deeply serrate, fringed with long spines and setæ of various lengths; the fifth joint narrow, slightly curved, with five groups of setæ on the convex front margin, and many groups of spines on the serrate hind margin; the finger short and slender, scarcely more than a third of the length of the fifth joint. In the Plate this and the succeeding peræopods are drawn on a larger scale than the two gnathopods; to give warning of this, as well as could conveniently be managed, on the Plate itself, I have added figures of the natural size to show the comparative proportions of the second gnathopod and fifth peræopod.

Third Peræopods.—The hind lobe of the side-plates deeper than the front one. The limb is very similar to that of the two preceding pairs, the undilated first joint rather longer, the third shorter, with both margins serrate and fringed with setæ, some of those on the front being so strong as rather to deserve the name of spines; the fourth joint has on the hind margin an apical group of spines and setæ, and two groups of setæ higher up; the fifth joint is longer than the fourth or third, and longer than the fifth joint of the preceding pair.

Fourth Peræopods.—The side-plates behind nearly as deep as the hind lobe in the preceding segment. The first joint expanded, the margins nearly parallel, scarcely serrate; numerous very long setæ arise on the inner surface along the hind margin within the wing; there is a fold of the integument on the outer surface at the upper part near the front margin; upon this margin there are various setæ; the remainder of the limb resembles the corresponding part of the preceding pair, but with the third and fifth

joints longer, the fourth pair of peræopods being the longest, while the fifth is the shortest.

Fifth Peræopods.—Side-plates small. Branchial vesicles well developed. First joint of the limb shorter in front than that of the preceding pair, but longer behind, the lower well-rounded lobe being produced considerably below the second joint; the third joint is shorter than the fourth or fifth, with small groups of spines or setæ on both margins; the fourth joint rather longer than the fifth, with the hind margin nearly straight, with an apical group of small spines, and one higher up, the front margin strongly serrate, armed with many groups of long spines; the fifth joint straight, with five sets of small spines behind, and nine or ten groups of spines, large and small, on the serrate front margin; the finger straight.

Uropods.—The peduncles of all three pairs are very long, much longer than the rami, reaching nearly equally far back, the first pair slightly further than the third and the third than the second; they are carinate below and channelled above, with small spines along the upper edges, and in the first pair with setæ at the upper part; the rami are lanceolate, subequal, with the outer margin of the outer and the inner of the inner ramus nearly straight, the other two being more convex, all edged with small spines, and each having a nail at the apex, which seems to be of no very rigid texture.

Telson very small, the length very little exceeding the breadth, the shape almost triangular, with curved sides, cleft for a short distance, the apices rounded, scarcely dehiscent.

Length.—The two specimens are figured in the Plate of the natural size, the larger in the position figured measuring in a straight line from the forehead to the extremity of the third uropods just two inches, with a depth at the third peræon-segment of an inch and a half; the smaller specimen, being extended, measured within the same points over an inch and a half in length, with a depth of seven-tenths of an inch.

Locality.—Station 146, near Marion Island, December 29, 1873; lat. 46° 46′ S., long. 45° 31′ E.; depth, 1375 fathoms; bottom, Globigerina ooze; bottom temperature, 35°·6. One specimen (the larger). Trawled.

Station 147, east of Marion Island, December 30, 1874; lat. 46° 16′ S., long. 48° 27′ E.; depth, 1600 fathoms; bottom, Diatom ooze; bottom temperature, 34°·2. One specimen (the smaller). Trawled.

Remarks.—The specific name refers to the striking difference in size between this and the earlier known species of the genus, which range from little more than the fifth of an inch down to the tenth of an inch. Boeck's *Andania abyssi*, it may be noted, is reported from depths between 100 and 300 fathoms.

Andania boecki, n. sp. (Pl. XXXVI.).

The head almost concealed beneath the overhanging first segment of the peræon; the first three segments of the pleon longer than any of the peræon except the first, their postero-lateral angles not acute, yet scarcely rounded; the second, third, and fourth segments with a transverse dorsal depression, the second and third with small spines along the lower margin; the animal more elongate in proportion to its depth than *Andania gigantea;* the integument showing prismatic hues in spirit, much or all of it covered with hexagonal markings.

Eyes not perceived.

Upper Antennæ.—The three joints of the peduncle very short and thick, the first as long as the other two, the third being shaped as in the preceding species; the flagellum of fourteen joints, the first longer than the rest united and longer than the peduncle, very broad at the base, tapering, bordered with a thick brush of cylinders in about sixty broad rows, serrate towards the distal end and armed with long spines; the other joints have distal rows of spinules; the secondary flagellum is nearly as long as the first joint of the primary, in the channelling of which it is lodged; it is strongly curved, ribbon-like, fringed with setules or spinules, and carrying at the apex some very long spines; there may be a minute second joint.

Lower Antennæ considerably longer than the upper. First three joints very short, gland-cone small, decurrent, blunt; fourth joint longer than the preceding three united, with several setæ on the surface and lower margin; fifth joint more than twice as long as the fourth, thickest at the base, its upper side covered with fine hairs; flagellum of more than twenty-five joints, the first the longest, the distal margins of the first eighteen oblique.

Epistome carinate; upper lip with two unsymmetrical lobes, which in the Plate are folded back, but whether that represents their natural position, I cannot say for certain.

Mandibles.—The cutting edge of great breadth, with a small denticle at the top and with a much smaller just below, and a sort of tooth on the upper margin behind it; the edge itself is scarcely convex, drawn out below into a blunt tooth; the lower margin is cut into fine teeth or serrations for a short space; it then presents a forward-directed tooth, from which a curved beaded line runs up the surface, the margin itself forming two overlapping curves; this applies to what is apparently the left mandible; that which I suppose to be the right is rather shorter, otherwise very similar, but without the prominent tooth of the lower margin, having on the other hand on the surface near the lower apical tooth a curved groove or fold of the integument suggestive of an inchoate secondary plate; moreover, near the inner angle of the lower margin there is a small opening in the integument from within which issues a seta; at the inner corner of the upper margin each mandible has what appears to be an articulating process.

Lower Lip.—The principal lobes very broad, flat-topped, with a large outstanding tooth at the outer corner, with some strong cilia behind it, but the margin immediately in front of it free from cilia; from the outer corner a curved band of long cilia runs across the lobe towards the centre of the base; the inner margin is free from cilia, but has a small projecting process some way down; the mandibular processes are broad, folded as in *Andania gigantea*.

First Maxillæ.—The inner plate having about twenty strongly plumose setæ along the inner margin, some of the lower ones rather longer than the upper; the outer plate as in *Andania gigantea;* the first joint of the palp very short, the second joint with its apex more rounded than in the preceding species, the spines less elongate, and very slightly feathered.

Second Maxillæ similar to those of *Andania gigantea*, the row of longer plumose setæ or spines numbering about five and twenty, set in a sinuous row, the centre part of which is removed from the margin; the shorter spines almost as numerous, plumose below, denticulate above; the narrow outer plate with about twenty spines of different sizes round its distal margin, and two near the middle of the outer margin, of which there is no trace in the other species.

Maxillipeds.—Inner plates broad and inflated, not reaching as far as the distal end of the first joint of the palp, the inner margin and adjacent surface having numerous very long plumose spines, the broad, truncate, indented distal margin also carrying six or seven similar spines, and the series being continued by seven shorter spines round the distal part of the outer margin; the outer plates and palp similar to those of the preceding species; the first joint of the palp has, like the second, apical spines on the outer margin, which in this species is much longer than the inner; the second joint has one or two groups of spines on the outer border besides those at the apex, and the narrow third joint has two or three such groups, the arrangement not being entirely symmetrical. The dorsal cilium of the finger not perceived.

First Gnathopods.—The side-plates in this species agree with those described in *Andania gigantea*. The first joint reaches beyond the side-plate, the front margin fringed with short spines, the hind margin carrying long setæ on the upper part, and a small apical group of spines; the second joint with a few spines on the hind margin and its apex; the third joint nearly rhomboidal, with a few feathered spines on the front and hind margins, many and long on the distal; the wrist triangular, distally cup-like, broader than the hand, subequal to it in length, with long spines round the serrate hind margin, a long row round the distal margin, a long row parallel to this on the outer surface, with a smaller row nearer the base, while on the inner surface there are two long oblique rows; the hand tapers distally, with a somewhat ovate form, the hind margin fringed with finely feathered spines, the front margin having spines at the apex and at two points above it, the inner surface having two longitudinal slightly oblique rows, or

succession of groups of spines, the outer surface being similarly adorned, but with rather less fulness; the finger slender, short, curved, not nearly half the length of the hand, with a minute dorsal cilium close to the base.

Second Gnathopods.—Branchial vesicles large and inflated. First joint of the limb reaching beyond the narrow side-plate, the upper part narrow for a short space, then making a bend and widening slightly, the front margin almost unarmed, the hinder with long setæ and an apical group of spines; the second with two small groups of plumose setæ on the hind margin and a large group at its apex; the remaining joints similar to those of the first gnathopods, but the third joint is without spines on the front margin, the wrist is narrower, the hand is narrower and longer, the armature of both wrist and hand being slighter, though the same in general character.

First Peræopods.—First joint scarcely reaching beyond the side-plates, the front margin straight, with three small spines near the apex, the convex hind margin carrying long setæ about the centre, and some spines on the lower part; the second joint with four or five setiform spines on the hind margin; the third joint longer than the fourth or fifth, fringed with spines on the hind margin, and carrying some spinules on the adjoining surface, with eight short spines placed along the convex front margin, the apex decurrent, fringed on the inner side with spines; the fourth joint longer than the fifth, fringed behind like the preceding joint, and also having rows of spinules on the surface, the front margin carrying four groups of short spines; the fifth joint slightly curved, narrowed distally, with nine groups of short spines along the serrate hind margin and five small groups on the adjoining surface, the convex front margin having spinules at five or six points; the finger slender, slightly curved, not half the length of the fifth joint.

Second Peræopods.—Side-plates at the widest point, just below the excavation, very much wider than the two preceding plates together, the breadth and depth subequal. The broad branchial vesicles not extending below the side-plates. The first joint not reaching the lower margin of the side-plate, the long setæ of the hind margin extending to the apex; the limb in general like that of the first peræopods.

Third Peræopods.—Hind lobe of the side-plates the larger, the front one closely fitting into the excavation of the preceding plate. The branchial vesicles of this and the next pair very large. The first joint not dilated, but a little wider above than below, both margins bordered with rather short curved spines, the lower half of the hind margin fringed with very plumose setæ; the four following joints all serrate and fringed with groups of spines in front; the third joint longer than the fourth, subequal in length to the fifth, its hind margin slightly serrate, with seven single spines along it and a group about the decurrent apex; the fourth joint with three groups of spines on the hind margin; the fifth joint slender, slightly curved, with some spinules behind; the finger as in the preceding pair.

Fourth Peræopods.—Side-plates rather broadly and deeply lobed behind. The first

joint expanded, though not very widely, the hind margin almost straight, scarcely serrate, the front margin a little convex, fringed with spines, the inner surface carrying a fringe of long plumose setæ, the lower margin rounded behind, overlapping the second joint; the armature of the following joints very similar to that in the preceding pair, but the fourth joint considerably longer and slightly curved; the fifth joint also much longer, this exceeding the length of the fourth, and the fourth that of the third.

Fifth Peræopods.—Side-plates not very deep. Branchial vesicles well developed. First joint much broader above than below, with the front margin much shorter than the hinder, convex above, straight below, armed with few spines; the hind margin very convex, slightly serrate, the lower lobe greatly overlapping the second joint; the second joint with a distal row of small spines in front; the next three joints much shorter than in the preceding pair; the third joint subequal in length to the fourth and also to the fifth, fringed in front with many small spines and some larger at the apex, carrying five spines on the hind margin, and an apical group; the fourth joint straight, with seven groups of large spines in front, and four of small ones behind; the fifth joint with eight groups of long slender spines in front, and three of spinules behind; the finger very slender, straight, longer than half the fifth joint.

Pleopods.—Coupling spines long and slender, the shafts plumose, the bent apex small, one margin having four, the other three, small retroverted teeth just below the apex. Immediately below the coupling spines, there are some slender acute spines, setiform, plumose. The cleft spines form a series of six; they are long, especially the lower ones, but the arms of the cleft are short, the acute arm being coarsely serrate on the inner side. The peduncles, as usual, are longest in the first pair, shortest in the third; the joints of the rami number about twenty-two on the inner, and about twenty-five on the outer, somewhat curved, ramus.

Uropods.—The peduncles of all three pairs broad and long, those of the first and third pairs reaching slightly beyond those of the second, all of them much longer than the rami, and seemingly all of them carinate and channelled as in the preceding species; the first two pairs have very numerous spines fringing the edges, those on the inner side being the longer; they have also along the centre fringes of long setæ; the peduncles of the third pair seem to be almost unarmed; in each pair the rami are a little unequal, those of the first and second pairs carinate, with many small spines on the edges; those of the third pair are broader but not longer than those of the two preceding pairs, not carinate, carrying but few spines, with the inner edge of the outer and the outer edge of the inner pectinate, while in the other two pairs the outer edge of each ramus is pectinate.

Telson very small, very little longer than broad, the convex sides converging to an almost pointed apex.

Length.—The specimen, in the position figured, measured, from the front of the head to the apex of the third uropods, close upon nine-tenths of an inch.

Locality.—Station 120, off Pernambuco, September 9, 1873; lat. 8° 37′ S., long. 34° 28′ W.; depth, 675 fathoms; bottom, red mud. One specimen. Trawled.

Remark.—The specific name is given in honour of the late Axel Boeck, who instituted the genus *Andania*, and who stands in the very foremost rank among the investigators of the Amphipoda.

Andania abyssorum, n. sp. (Pl. XXXVII.).

Lateral lobes of the head rather prominent; first segment of the peræon as long as the next two united, less overhanging than in the two preceding species; the postero-lateral angles of the first three pleon-segments not acute, a little rounded; the following segments abruptly shallower, the fourth almost concealed beneath the third, the sixth longer than the fifth, with two longitudinal ridges running from the base of the segment to either side of the base of the telson.

No *Eyes* perceived.

Upper Antennæ.—Peduncle shorter than the flagellum, the first joint very stout, scarcely longer than broad, longer than the two next joints united; the flagellum tapering, of four joints, the first as long as the other three together, rather longer than the first joint of the peduncle, with a brush of cylinders, and at the apex some spinules and a long spine; the narrow, slightly curved, secondary flagellum is not half as long as the first joint of the primary, seemingly one-jointed, with a long subapical spine.

Lower Antennæ.—First joint a little dilated; gland-cone very small; third joint forming an angle with the fourth; fourth rather longer than the fifth; the two together longer than the slender six-jointed flagellum.

Mandibles.—The cutting edge broad, almost straight, with a very minute denticle at the top, but sharply upturned below, with some conspicuous though microscopic denticles; on the inner surface near the lower angle, but connected by a groove with the upper, is a small triangular secondary plate on the right mandible, and some distance behind this on the outer surface there is a seta; on the left mandible there is no secondary plate, but the seta is present, arising from a curved groove on the outer surface.

Lower Lip.—The principal lobes apically narrow, with a small tuft of cilia or setules standing out at about the centre of the apical margin; a band of long cilia appears to cross the surface as in the other two species.

First Maxillæ.—The inner plate carrying seven stout strongly plumose setæ along the inner margin; the truncate distal margin of the outer plate armed with nine denticulate spines, rising amidst very long and spine-like cilia; the first joint of the palp not very short, the second reaching as far as the outer plate, its outer margin convex, its

apex armed with six spines, of which the outermost is minute, but the two adjoining it are very large.

Second Maxillæ.—The inner plate longer and much broader than the outer, with many plumose setæ and spines on the inner margin, probably twenty or thirty in all; the outer plate carrying eight long spines on the truncate apex.

Maxillipeds.—The inner plates not nearly reaching as far as the distal end of the first joint of the palp, the inner margin apically produced into a tooth surmounted by a spine-tooth; the outward sloping distal margin having two smaller processes, each with a small spine-tooth, and the outer corner carrying three spines; the outer plates rather long and narrow, but not reaching the end of the second joint of the palp; the nearly straight, serrate, inner margin fringed with about fifteen short spines; there is one on the almost pointed apex, and a few on the surface; the first joint of the palp rather shorter than the second, with two plumose setæ on the inner margin; the second joint with seven setæ on the inner margin and two on the outer apex; the third joint very slender, with some apical spines or setæ; the finger also very slender, slightly curved, shorter than the preceding joint.

First Gnathopods.—Side-plates triangular, deeper than broad, with the front margin curved, and below forming an acute angle with the hinder margin. First joint reaching beyond the side-plate, broader below than above, the front margin fringed with small spines, the lower ones rather longer and plumose; the hind margin carrying many long setæ, and an apical group of spines; the second joint much longer than broad, with some spinules in front and behind, and a group of spines on the hinder apex; the third joint scarcely so long as the second, with a large apical group of spines and some smaller groups on the hind margin; the wrist as long as the hand and much broader, with groups of spines on the hind margin near and about the apex, also with spines at two points of the front margin near the apex, and a large group round the apex, some of these being longer than the hand on one of the gnathopods, though not upon the one figured in the Plate; the hand with the distal portion much narrowed, the serrate hind margin strongly fringed with various spines, one of which near the finger is more strongly plumose than the rest; the front margin is more convex near the base than distally, the two tracts being separated in one of the gnathopods by a group of several spines, in the other by two spines with an interval between them; there are some apical setules on this margin; the finger is slender and curved, not nearly half the length of the hand.

Second Gnathopods.—Side-plates narrow and elongate, the front margin very slightly convex, the hind margin closely interlocking with the following plate, as seems usual in this genus, the lower margin oblique, helping to form the continuous curve from the upper front corner of the first side-plate to the excavation of the fourth. The marsupial plates narrow, with a few setæ round the apex. First joint of the limb narrow, reaching beyond the side-plate, narrowest near the base, then making a bend forwards, with some

long setæ at various points upon the hind margin, the front but slightly curved; the second joint elongate, with long plumose setæ at four points of the hind margin; the third joint much shorter than the second, with a group of apical spines behind; the wrist scarcely as long as the hand, and but little broader, with spines on the lower part and apex of the hind margin, and on the apex of the front; the hand with the front margin almost straight, carrying spines at the apex; the hind margin smooth for a space, then serrate, with many groups of spines, many of those which are near the short strongly curved finger being strongly denticulate; the bending of the hind margin in this hand makes an approach to a palm.

First Peræopods.—Side-plates and branchial vesicles similar to those of the preceding pair, but a little longer, the side-plates also broader. The first joint scarcely reaching beyond the side-plates, considerably broader than that of the second gnathopods, carrying a few spinules on the front margin, and a spine on the hinder apex; the second joint with two setæ on the hind margin and an apical spine; the third longer than the fourth, rather shorter than the fifth, with a spinule on the decurrent front apex and one on the margin a little higher up; the fourth joint slightly curved, each apex pointed; the fifth joint slender, curved, almost unarmed, with a tendency to pectination on the hind margin; the finger very short, curved.

Second Peræopods.—Side-plates very broad, very deep in front, with a small interlocking process near the top of the front margin. Branchial vesicles not very broad, not as long as the side-plates. Marsupial plates much narrower than the branchial vesicles, and about as long. First joint of the limb not reaching the end of the side-plate; the limb in general like the preceding, but the fourth and fifth joints smaller, the third being longer than either.

Third Peræopods.—Side-plates small, the hinder lobe the larger, the front one when *in situ* obscured by the preceding plate. The branchial vesicles oval, not very large. The marsupial plates short, with eleven setæ round the apex. The first joint not expanded, a little narrowed at the centre, with a few spines or spinules on the margins; the second joint, as in the preceding pairs, not so short as usual, with two or three small spines on the front margin; the third joint much longer than the fourth, a little longer than the fifth, with short spines at four points of the very decurrent hind margin, and the same number of spinules on the front; the fourth joint with some microscopic spinules on the straight, apically acute, front margin; the fifth joint a little curved, the front margin finely pectinate; finger nearly half the length of the fifth joint.

Fourth Peræopods.—Side-plates rather deeper than broad, front margin straight, hinder a little convex. Branchial vesicles widening distally. First joint expanded, rather wider below than above, front margin nearly straight, furnished with a few spinules; the hind margin very slightly convex and scarcely serrate, the lower margin smoothly rounded and partially overlapping the second joint; the remainder of the limb similar to

the corresponding part of the preceding pair, but with the third joint still more decurrent, and the fourth and fifth joints rather longer.

Fifth Peræopods.—Side-plates similar to the preceding pair, but smaller. Branchial vesicles small. First joint greatly expanded, longer than broad, its length surpassing that of the next four joints united; the front margin nearly straight, carrying a few small spines, the hind margin serrate, very convex, the lower margin rounded, partially overlapping the short second joint, which has spines at two points of the front margin; the third joint has spines at two or three points in front, and at four points of the hind margin, which is decurrent almost to the apex of the fourth joint; the fourth joint has spines at four points of the front margin, the apex of which is acute; the fifth joint, which is longer than the fourth, but shorter than the third, has a single spine near the centre of the pectinate front margin; the finger is more than half the length of the fifth joint, its inner margin pectinate.

Pleopods.—The coupling spines are very slender, with three or four minute teeth on either side close to the apex; near them is a plumose seta; from a process at the top of the peduncle another plumose seta projects; the first joint of the inner ramus has two cleft spines, in which the branches are nearly equal, the outer, as usual, serrate on its inner margin; the inner ramus has seven, the outer eight joints.

Uropods.—As in the two preceding species, the peduncles appear to be carinate and channelled; the first pair both as regards the peduncles and the rami reaching a very little beyond the second, and the second beyond the third; the first and second pairs, but not the third, have some spines on the edges of the peduncles; all the rami have pectinate edges; in the first pair the longer outer ramus has two spines on the upper part of the outer margin, in the second pair there is but one spine; in the third pair the rami are nearly equal in length to the peduncles, the outer ramus being a little longer than the inner, its distal portion consisting of a nail which is more than a third of the total length.

Telson about as broad as long, very small, not nearly reaching the end of the peduncles of the third uropods, its curved sides converging to an acute apex, which is cleft for about a third of the length of the telson, not dehiscent.

Length.—The specimen, in the position figured, measured, from the front of the head to the back of the second segment of the pleon, one-fifth of an inch.

Locality.—Station 168, off New Zealand, July 8, 1874; lat. 40° 28′ S., long. 177° 43′ E.; depth, 1100 fathoms; bottom, blue mud; bottom temperature, 37°·2. One specimen; female. Trawled.

Remark.—The specific name refers to the great depth from which this little creature was obtained, but is principally designed to call attention to its close relationship with the northern species, *Andania abyssi*, Boeck.

Family Amphilochidæ, G. O. Sars, 1882.

Boeck in 1876 constituted the Amphilochinæ the second subfamily of the family Leucothoidæ, assigning to it the genera *Amphilochus*, *Gitana* and *Astyra*; in 1882 Sars changed the subfamily into a family, and added the new genus *Stegoplax*, which is near to the earlier *Cyproidia*, Haswell, and the still earlier but somewhat obscure *Peltocoxa*, Catta. Boeck's definition is as follows:—

"*Upper Lip* much incised at the apex.

"*Mandibles* strong, not uniform, apically dilated; one mandible with, the other without, an accessory plate (ramo interno); the molar tubercle more or less prominent; the palp three-jointed, elongate.

"*First Maxillæ* with the inner plate small; the palp generally two-jointed, apically armed with spines.

"*Second Maxillæ* with the outer plate a good deal narrower than the inner.

"*Maxillipeds* with the inner plates long, narrow; the outer plates of moderate size or small; the palp more or less elongate; its last joint unguiform.

"The body tolerably deep, thick; the side-plates large.

"*Upper Antennæ* short, the secondary flagellum absent or small.

"*First* and *Second Gnathopods* generally of the same shape, either subchelate—sometimes powerful sometimes feeble—or scarcely subchelate.

"*First* and *Second Peræopods* slender, filiform.

"Last three pairs of *Peræopods* successively longer.

"*Uropods* biramous; the second pair very short, the outer branch shorter than the inner.

"*Telson* whole or incised at the apex."

Genus *Amphilochus*, Spence Bate, 1862.

For the original definition see Note on Spence Bate, 1862 (p. 333). Boeck defines it as follows:—

"*Mandibles* with the third joint of the palp as long as the second or longer.

"*First Maxillæ* with the palp two-jointed; the second joint broad at the apex.

"*First* and *Second Gnathopods* with large subchelate hands."

Remark.—The name of this genus must not be confounded with *Amphilocus*, the name of a genus of Coleoptera.

Amphilochus marionis, n. sp. (Pl. XXXVIII.).

Animal compact; first three segments of the pleon with the postero-lateral angles nearly right angles, those of the third segment projecting when the following segments

are ventrally flexed; the sixth segment outdrawn on either side as far as the apex of the telson.

Eyes small, oval.

Antennæ broken.

Upper Lip.—The two distal lobes very unsymmetrical.

Mandibles.—The cutting plate is a rather narrow plate attached as it were by a neck to the trunk of the mandible, having the distal border cut into about ten small teeth; the secondary plate on the left mandible is similar to the principal, but on a smaller scale; the spine-row consists of ten curved denticulate spines, graduated in size, the larger being near to the cutting plate; the molar tubercle (not shown in the figures *m.m.*) is conical, scarcely if at all dentate; the palp is set far back, its first joint short, the second straight and moderately long, but the two together not equalling the length of the thin, curved third joint, which is a little ciliated at the acute apex.

Lower Lip.—The front lobes distally narrow, armed with strong but short cilia, widely dehiscent; the inner lobes narrow; the mandibular processes short, distally pointed.

First Maxillæ.—Inner plate small, oval, with a single short seta at the apex; outer plate with, I think, seven spines, some of them denticulate, on the oblique apical margin, together with some spine-like cilia at the inner corner; the palp rather broad, the second joint having four short spines on the truncate distal margin, which is produced into a small tooth at one corner.

Second Maxillæ.—The plates about equal in width, the inner with a few setules or spines at the apex and passing a little way down the inner margin; outer plates damaged in dissection.

Maxillipeds.—Inner plates long and narrow, not reaching the distal end of the first joint of the palp, the inner margin ending apically in a little tooth, besides which the distal margin seems to have two scarcely visible spine-teeth; there are long fine cilia to be made out with difficulty on various parts of the plate; the outer plates are very broad, not reaching the end of the second joint of the palp, with a very few spinules on the surface within the straight, smooth, inner margin; the broad, rounded, distal margin is finely pectinate on the inner part; about the centre it carries a single conspicuous serrate spine, and the outer part is strongly ciliated; the first joint of the palp, which is the longest, has some apical spines on both sides; the second joint has more; the third joint is longer than the second, but narrower, with spines at two points on the outer margin, and many round the serrate distal margin; the finger is short, tapering to a very fine point, its inner margin pectinately fringed with cilia as far as the nail.

First Gnathopods.—Side-plates small, almost concealed by the following pair, the hind margin straight, the front almost semicircular. The first joint equal in length to the hand, with an apical spine on the hind margin, and one or two spinules along the

front; the short second joint with one apical spine behind, the rhomboidal third joint with three, and one at the centre of the hind margin; the wrist short, broad, distally cup-like, with nine or ten spines on the inner side of the hind apex, which is produced along the hind margin of the hand, the tips of the spines reaching the palm; the hand large, widest at the palm, the front margin convex, with a submarginal cilium near the centre, a subapical seta and cilium, and rounded apex, the hind margin sinuous, smooth or microscopically downy; the palm broad, convex, finely pectinate, at right angles with the hind margin, having two palmar spines at the commencement, followed by a row of nine submarginal spinules, and two setules close to the hinge; there are a very few slender spines on the surface; the finger is long, a little curved, tapering to an extremely fine point, reaching beyond the palm, the inner margin of the broader half near the base set with about fifteen little spiny teeth.

Second Gnathopods.—Side-plates longer and broader than the first, rather wider below than above, lower margin rounded and slightly crenate as in the two following pairs. The branchial vesicles in this and the following segments small, oval. The marsupial plates very small, and, so far as observed, without setæ. First joint of the limb longer than the hand, slightly curved, with a few setules along the concave front margin, the hind margin with an apical spine, the first half of which is broad, the distal half narrow, the corresponding spine on the first gnathopods having probably the same character; the second and third joints resemble those of the preceding pair, except that the third joint has three short but stout spines along its hind margin, the largest near the apex, which has one slender spine; the wrist is distally cup-like, short except for the very long hinder process, the apex of which nearly reaches the palm of the hand and is tipped with three or four spines; the hand resembles that of the preceding pair, but like the rest of the limb is very much larger, the submarginal spinules eighteen in number, the front margin having a little cilium-bearing apical point which is not produced; the finger has twenty teeth, some of which are submarginal but the majority marginal as in the preceding pair; the series ends with a much larger tooth or spine; there is a minute dorsal cilium very far from the base of the finger.

First Peræopods.—Side-plates larger than the preceding pair, but similar. The first joint reaching below the side-plate, carrying some setules on the front margin, and an apical spine on the hinder; the second joint with two setules on the hind margin; the third joint slightly curved, with small spines at four points on each margin, the front margin apically decurrent. The rest of the limb missing, a defect shared by all the peræopods.

Second Peræopods.—Side-plates much broader than the preceding pair, the excavation behind not descending far, the broadest part of the plate just below it. The limb like that of the preceding pair, but the first joint not reaching beyond the side-plate.

Third Peræopods.—The hind lobe of the side-plate deeper than the front. The

branchial vesicles scarcely reaching beyond the hind lobe of the side-plate. The first joint expanded, of nearly even width throughout, but with convex margins, the front fringed with eight small spines, the hinder serrate, carrying cilia; the short second joint has two spines on the front margin; the third has five on the straight front margin, three or four on the hind margin, and a group at its very decurrent apex.

Fourth Peræopods similar to the third, but rather larger.

Fifth Peræopods.—The first joint broader than the preceding, and behind much longer, the hind margin rising above and descending below the front; both margins very convex; the second and third joints similar to those of the fourth peræopods.

Pleopods.—The coupling spines very short, with two strong, lateral, retroverted teeth besides that at the apex; on the peduncle of the third pair there was observed an apical spine; the inner ramus carries apparently only one cleft spine; the joints of the inner ramus seven in number, of the outer eight.

Uropods.—Peduncles of the second pair as long as the inner ramus, reaching as far as or a little beyond the apex of the telson; the inner ramus much longer than the outer, slender, with three or four spines on either margin, and ending in a sharp nail; the outer ramus more than half the length of the inner, with three spines on the inner margin, not ending in a nail but very acute. The other pairs missing.

Telson not twice as long as broad, the sides a little curved, converging to a pointed apex.

Length.—The specimen, in the position figured, measured, from the top of the head facing forwards to the top of the third segment of the pleon facing backwards, scarcely one-tenth of an inch, a size which may suggest an excuse for the imperfect account of the mouth-organs.

Locality.—Station 145, off Marion Island, December 27, 1873; depth, 100 fathoms; bottom, volcanic sand. One specimen; a female, with eggs.

Remarks.—The specific name refers to the place of capture. A specimen of *Amphilochus* from the Clyde, kindly sent to me by Mr. David Robertson, agrees in most respects with Boeck's description of his *Amphilochus tenuimanus*, and has also a great resemblance to the present species; the maxillipeds in the Scotch form and in that from the Southern Ocean are remarkably alike, but in the smaller Challenger species the outer plates of these organs are distally broader, and though having the same armature have it differently arranged; the third joint of the mandibular palp is much longer than the second, instead of about equal to it; the finger in each pair of gnathopods is prolonged beyond the palm, and is very different from that of the larger species; there appear also to be differences in the shape of the side-plates, and altogether the sum of the differences, added to the great distance between the localities at which the specimens occur, makes it unsafe to place the northern and southern examples in one and the same species.

Family Stenothoidæ, G. O. Sars, 1882.

Boeck in 1876 constituted the Stenothoinæ the third subfamily of the Leucothoidæ, assigning to it the genera *Stenothoë*, *Metopa*, *Cressa*, and by implication *Danaia*, if that should prove to be distinct from *Cressa*.[1] In 1882 Sars changed the subfamily into a family. Boeck defined the subfamily as follows:—

"*Upper Lip* apically cleft.

"*Mandibles* elongate, apically broad, dentate, not uniform; the left mandible with an accessory plate; the molar tubercle minute or absent; the palp absent, or long, three-jointed.

"*Lower Lip* little.

"*First Maxillæ* with the palp one- or two-jointed; the inner plate small or wanting.

"*Maxillipeds* with long palps; the inner plate very small, the outer almost obsolete.

"The body compressed, but yet thick; the first side-plate little, covered; the rest of the side-plates much increasing in size; the fourth generally very large, shield-shaped.

"*Antennæ* moderately elongate; the upper devoid of accessory flagellum.

"*First Gnathopods* slender; hand often not subchelate.

"*Second Gnathopods* with the hand strongly subchelate.

"*Third*, *Fourth*, and *Fifth Peræopods* of the same shape; first joint of the *Third* and *Fourth* generally not dilated.

"*Last Uropods* uniramous; the ramus two-jointed; the last joint stiliform.

"*Telson* small, not cleft."

Remark.—A rudimentary accessory flagellum is sometimes present on the upper antennæ. The right mandible, at any rate in some species, has a secondary plate, though it is less conspicuous than that on the left mandible.

[1] Spence Bate says that the mandibles in *Danaia* are without a palpiform appendage (Brit. Mus. Cat. Amph. Crust., p. 59; Brit. Sess. Crust., p. 67); the genus *Cressa* of Boeck is distinguished from *Danaia* solely by its possession of a three-jointed mandibular palp; it is therefore worth while to notice that in Spence Bate's British Museum Catalogue, on pl. x., there is a figure of a mandible with a three-jointed palp in close proximity to the figure of *Danaia dubia*; unfortunately the mandible is by some accident unnumbered, but the figure shows it to be of such a character that, unless it belongs to *Danaia*, it cannot belong to any of the species figured on pl. x. It becomes therefore highly probable that the definition of *Danaia* requires amendment, and that *Cressa* of Boeck is a synonym of it, as already on other grounds it has been considered by Sars.

Genus *Stenothoe*, Dana, 1852.

1852. *Stenothoe*, Dana, On the Classi. Crust. Choristopoda, Amer. Journ. Sci. and Arts, vol. xiv.
1852. ,, ,, United States Expl. Exp. Crust., vol. xiii. pt. ii. pp. 909, 923.
1853. *Probolium*, Costa, Rend. d. Soc. r. Borb. Acad. d. scienze.
1857. ,, Costa, Ricerche s. crost. Amfip. Nap., p. 199.
1857. *Montagua*, Spence Bate, Ann. and Mag. Nat. Hist., No. cx.
1857. ,, White, Popular Hist. Brit. Crust., p. 166.
1860. *Stenothoë*, Boeck, Forh. ved. de skand. Naturf. 8de Mode, p. 655.
1861. *Montagua*, Bate and Westwood, Brit. Sessile-eyed Crustacea, vol. i. p. 53.
1862. ,, Spence Bate, Brit. Mus. Cat. Amph. Crust., p. 54.
1862. *Stenothoë*, Spence Bate, Brit. Mus. Cat. Amph. Crust., p. 60.
1865. ,, Lilljeborg, On the Lysianassa magellanica, p. 18.
1866. *Probolium*, Heller, Beiträge zur näheren Kenntniss der Amph. des Adriat. Meeres, p. 13.
1869. ,, Norman, Last Report on dredging among the Shetland Isles, p. 273.
1870. *Stenothoë*, Boeck, Crust. Amphip. bor. et arct. p. 59.
1876. ,, Boeck, De skand. og arkt. Amph., p. 446.
1880. *Probolium*, Nebeski, Beiträge zur Kenntniss der Amph. der Adria., p. 33.
1885. ,, Carus, Prodr. Faunæ Mediterraneæ, p. 407.
1886. *Stenothoë*, Gerstaecker, Bronn's Klassen und Ordnungen, Bd. v. Abth. ii. p. 506.

For the original definition see Note on Dana, 1852 (p. 257). Boeck's definition is as follows :—

"*Mandibles* without palp or molar tubercle.
"*First Maxillæ* with the palp two-jointed.
"*Third Peræopods* with the first joint not dilated behind.
"*Fourth Side-plates* not excavate behind, but much rounded."

Stenothoe adhærens, n. s. (Pl. XXXIX.).

Rostrum and lateral lobes of the head not very conspicuously outdrawn; the postero-lateral angles of the first and second pleon-segments acute, but not outdrawn, those of the third segment blunt, the fourth segment with a small dorsal depression, the fifth segment very short.

Eyes between round and oval, low down on the sides of the head, the crystal cones very bright; the figure *oc.* does not show the whole number.

Upper Antennæ.—First joint longer than broad, much broader than the second, as long as the second and third united; the third not half the length of the second; the flagellum of seventeen joints, of which the first is longer than the third joint of the peduncle; they have apical setules and some of them cylinders.

Lower Antennæ.—First joint expanded, second very distinct from the first, gland-cone very small, third scarcely longer than the second, the fourth longer and broader than the fifth, with some small spines and setules on the convex upper, and setules on the straight lower, margin; both margins of the fifth straight, carrying a few setules;

flagellum of fifteen joints, of which the first is the longest, all united rather shorter than the peduncle.

Upper Lip.—The distal end unsymmetrically bilobed, the edges not furred.

Mandibles having an appearance as if the front part were folded or a little inflated so that the spine-row while projecting from an inner edge nevertheless rests against the inner unbulged surface. The cutting edge of the left mandible (represented on the right of the Plate) has a broad sinuous edge cut into about eighteen denticles; the secondary plate has a broad edge cut into about a dozen denticles; on the right hand mandible the cutting edge appears to have only seven or eight denticles, but some of these, especially two at the centre, considerably larger than those on the opposite mandible; there appears to be a very thin broad-edged secondary plate, with the edge finely dentate, wearing a striated appearance; the spine-row of ten or eleven spines; molar tubercle and palp absent.

First Maxillæ.—Inner plate with an almost acute apex and a single subapical seta; the outer plate short, carrying six spines on the truncated distal margin, the inner one much shorter than the rest, smooth, the next two long, finely denticulate, the fourth long, smooth, the fifth very slender, the sixth more slender than the fifth; the inner margin almost straight, conspicuously ciliated or edged with spinules; the first joint of the palp as broad as long, the second not twice the length of the first, with two or three spine-teeth on the apex, a subapical seta, and five small spines along the serrate inner margin.

Second Maxillæ not well made out in the specimen figured. A second specimen shows them to be short, the outer plate bending over the very short inner one; the inner plate has four setæ spaced upon its margin, one of them being on the rounded apex; the inner plate has four setæ on its somewhat truncate apex and one on the outer margin, this margin being convex, much longer than the smooth inner margin.

Maxillipeds.—The inner plates minute, elliptic, with two apical setæ, reaching a very little way along the inner margin of the broad second joint, which carries no plate, but appears to be part of the elongate palp, having two apical spines on the outer side, and half a dozen spines or setæ on or near its inner margin; the first joint of the palp rather longer than broad, equal in length to the third, longer than the second, all three carrying a few spines on the inner margin, the third having a long spine on the inner apex, three long ones near the outer apex, and the distal part strongly ciliated; the finger broad at the base, tapering, with the inner margin carrying some ten spine-like cilia, the remaining half narrow, part of it fringed with short cilia, the inner margin being double for a short distance; there are two cilia near the tip.

First Gnathopods.—Side-plates very small, completely covered by the following pair; there are one or two setules on the front margin; the lower margin not projecting on either side of the first joint. The first joint entirely clear of the side-plate, equalling

in length the third, fourth, and fifth joints united; it has some setæ along the front margin, and a short apical seta on the hinder; the short second joint has two small spines or setules on the hind margin; the third joint is longer than the wrist, which it overlaps, subequal to the hand, its free front margin very short, the hind margin straight, carrying three spines, a little furred below; the rounded apical margin carrying a group of spines; the wrist triangular, distally cup-like, with an apical group of spines behind; the hand with a convex front margin much longer than the hind margin, which carries short stout spines at two points, and a third group at the commencement of the broad, oblique, finely pectinate palm, which is fringed with a few submarginal setæ; the finger is broad almost to the end, which is sharp, closing down upon the palmar spines; it has two dorsal cilia near the centre, the dorsal margin being much more convex than the finely pectinate inner margin.

Second Gnathopods much larger than the first. Side-plates large, almost semicircular. The branchial vesicles sac-like, much smaller than the side-plate. Marsupial plates very large, very broad, and very thin. First joint reaching beyond the side-plate, a little longer than the hand, distally widened and curved slightly forwards, with some spines on the hind margin; the second joint short, with one or two setules on the hind margin; the third joint short, with no free front margin, the hinder apically acute; the wrist short, cup-like, with a group of spines on the ciliated hinder apex; the hand large, not twice as long as broad, with a few spines on the basal half of the front margin; the hind margin continuous with the convex palm, which is but slightly toothed or indented, the chief prominence being a small one near the hinge of the finger; the finger is very long and broad, its apex passing beyond the palmar spines and resting against the surface of the hand just within the margin; its inner edge is smooth, with one or two cilia and a small decurrent tooth preceding the sharp apex.

First Peræopods.—Side-plates very broad, rather broader below than above, the hind margin longer than the front, the lower margin convex. Branchial vesicles pear-shaped, nearly as long but not nearly so wide as the side-plates. Marsupial plates smaller than the preceding pair. The first joint of the limb scarcely reaching beyond the side-plate, with spines along the front margin and lower part of the hinder; as in the preceding pair, this joint is distally lobed in front on two edges; the second joint is short, with a spine or two on the hind margin; the third is longer than the fourth, about equal to the fifth, with five spines on the front margin, and a group on its decurrent apex, some spinules in front and an apical spine; the fourth joint has spines at five points of the straight hind margin; the fifth joint is curved, and carries some seven groups of spines on the concave hind margin, the accessory thread in these and many of those previously mentioned arising at the centre of the spine; there are spinules or setules at four points of the hind margin; the finger is short and curved, little more than half the length of the fifth joint.

Second Peræopods.—Side-plates very large, broader than deep, the front margin but little convex, the upper and lower margins roughly forming with it a very much rounded triangle. The first joint not nearly reaching the end of the side-plate; the limb in general like that of the first peræopods, the third joint with three spines on the hind margin, four on the front, and an apical group.

Third Peræopods.—Side-plates small, rather deeper behind than in front. Branchial vesicles broad, broadest about the centre. First joint evenly wide, not expanded, much narrower than the branchial vesicles, with spines on both margins; the short second joint with two or three spines on the front margin; the third joint longer than the fourth or fifth, not very much shorter than the first, with five or six sets of spines on the straight front margin, and six spines along the convex hind margin, besides a small group on the blunt, very decurrent apex; the fourth joint with four groups of spines on the straight front margin, and a spinule at the apex of the hinder margin, which is almost completely overlapped by the preceding joint; the fifth joint curved, longer than the fourth, with five groups of spines in front, some spinules behind; the finger curved, more than half the length of the fifth joint.

Fourth Peræopods.—Side-plates small, lobed behind. Branchial vesicles sharply bent. First joint widely and evenly expanded, with spines at six points of the front margin, and some others within the margin, the hind margin very slightly crenate; the rest of the limb resembling the preceding pair, but exceeding it in size.

Fifth Peræopods.—Side-plates smaller than the preceding. The first joint larger than in the preceding pair, not evenly expanded, the breadth contracting below, and the lower lobe behind much overlapping the second joint; the rest of the limb similar to the preceding pair.

Pleopods.—Coupling spines very slender, much bent at the apex, with one or two lateral teeth; the peduncles narrow, the rami closely interlocked at their bases; a single cleft spine on the inner ramus; joints of the rami numbering from ten to fourteen.

Uropods.—Peduncles of the first pair longer than the rami, fringed with spines; the rami nearly equal, the outer a little the longer, both pectinate on the upper edge, apically acute, carrying a few marginal spines; the peduncles of the second pair equal in length to the longer ramus; the rami apically pointed, pectinate on the edges, the inner ramus with four, the shorter outer with three marginal spines; the peduncles of the third pair about equal in length to the ramus, carrying stout marginal spines; the single ramus with two spines at the apex of the broad proximal portion, the tapering nail not forming quite half of the ramus.

Telson twice as long as broad, each lateral margin at the upper part carrying four stout spines, the two margins curving to an almost pointed apex with a small cilium on either side of it, the surface carrying two large cilia midway between the apex and the lowest marginal spines.

Length.—The specimen, in the position figured, measured, from the front of the head to the back of the third pleon-segment, less than one-fifth of an inch. A second specimen, with numerous eggs, was slightly smaller.

Locality.—Station 142, off Cape Agulhas, December 18, 1873; lat. 35° 4′ S, long. 18° 37′ E.; surface temperature, 65°·5. Two specimens, both females.

Remarks.—The specific name refers to the capture of the specimens while adhering to the screw of the vessel.

Almost every part of the animal showed a number of little packets of cells, crystalline in appearance, embedded in brown matter, which I suppose to be pigment-cells; it is to these that figure *p* refers. The general effect produced was a series of transverse, somewhat broken, lines of colouring, increasing in breadth towards the lower margins of the large side-plates.

Genus *Metopa*, Boeck, 1870.

1842. *Leucothoë*, Krøyer, Naturhist. Tidsskr., R. i. Bd. iv. p. 157.
1845. „ Krøyer, Naturhist. Tidsskr., R. ii. Bd. i. p. 539.
1846 ? „ Krøyer, Voy. en Scand., pl. xxii.
1850. „ Liljeborg, Öfversigt af Kongl. Vet.-Akad. Förhandl., Årg. 7.
1851. „ Liljeborg, Öfversigt af Kongl. Vet.-Akad. Förhandl., Årg. 8.
1857. *Montagua*, Spence Bate, Synopsis; Ann. and Mag. Nat. Hist., ser. 2, vol. xix. p. 137 (5).
1857. „ White, Popular Hist. Brit. Crust., p. 166.
1859. *Leucothoë*, Bruzelius, Skand. Amph. Gamm., p. 96.
1861. *Montagua*, Bate and Westwood, Brit. Sess. Crust., i. p. 53.
1862. „ Spence Bate, Brit. Mus. Catal. Amph., p. 54, p. 370.
1865. „ Goës, Crust. Amph. Maris Spetsb., p. 6.
1868. „ Bate and Westwood, Brit. Sess. Crust., ii. p. 499.
1869. *Probolium*, Norman, Last Report on Dredging among the Shetland Isles, p. 273.
1870. *Metopa*, Boeck, Crust. Amph. bor. et arct., p. 60.
1876. „ Boeck, De skand. og arkt. Amph., p. 451.
1876. „ Sars, Prodromus descr. Crust., p. 355.
1884. „ Schneider, Crust. og Pycn. Kvaenangsfjorden, p. 71.
1885. „ Sars, Den norske Nordhavs-Exp., p. 185.
1886. *Stenothoë*, Gerstaecker, Bronn's Klassen und Ordnungen, Bd. v. Abth. ii. p. 506.
1886. *Metopa*, Norman, Mus. Norm., p. 14.
1887. „ Chevreux, Crust. Amph. Bret., p. 45.

For the original definition, see Note on Boeck, 1870 (p. 400). Boeck only gives two characters to distinguish this genus from *Stenothoe*, the three-jointed mandibular palp and the one-jointed palp of the first maxillæ; of these the latter must be withdrawn, since some species of the genus clearly have the palp of the first maxillæ two-jointed. Boeck apparently depends on Krøyer for the description both of *Leucothoë clypeata*, Krøyer, which he makes the type of the genus *Metopa*, and of *Leucothoë glacialis*, Krøyer, which he calls *Metopa glacialis*. Though Krøyer assigns a one-jointed palp to the first maxillæ

of the former, to the latter, as Boeck recognises, he attributes a two-jointed palp. Boeck unfortunately leaves the first maxillæ undescribed in all the other seven species which he places in the genus *Metopa*.

Metopa nasutigenes, n. sp. (Pl. XL.).

Rostrum wanting, lateral lobes of the head very inconspicuous; the postero-lateral angles of the first three pleon-segments not rounded, but not very acute.

Eyes round and bright, placed rather high up on the head; the ocelli not numerous, bright.

Upper Antennæ.—The first joint nearly twice as long as the two following united, excavate beneath and distally prolonged to a point forming a cap over the second and two-thirds of the third joint; the second joint thicker and longer than the third; the flagellum scarcely longer than the peduncle, consisting of ten slender joints, which have some apical cilia and long cylinders.

Lower Antennæ.—First joint a little inflated, gland-cone broad-pointed, third joint short and curved, fourth joint scarcely as long as the fifth, both slender; the flagellum of eight slender joints, not quite so long as the peduncle, nor yet so long as the flagellum of the upper antennæ.

Mandibles.—The cutting edge broad, with a denticle at the top, below this a smooth rim, and below this an angled piece cut into six or seven teeth or denticles; the secondary plate short, with a rather broad edge, finely denticulate; the spine-row of nine short curved spines in two detachments of three and six; a small process rises close to the base of the palp; the first joint of the palp longer than the third; the second more than twice as long as the first, with two slender spines or setæ on the inner margin and a longer one at its apex; the very short and narrow third joint is tipped with a spine more than twice its own length. The mandible here described, and figured in the Plate on the left, is the right mandible, the secondary plate and spines showing through the outer surface.

First Maxillæ.—Inner plate very small; outer plate short, with six spines on the truncate apex, one very short, of the rest the outermost almost setiform, the innermost finely pectinate, the intermediate ones with more or fewer lateral denticles; the palp broad, two-jointed, with three small spine-teeth on the distal part of the inner margin, two on the apical margin with some intermediate spinules, and two submarginal setæ.

Second Maxillæ.—The inner plate shorter than the outer, with three setules at intervals on the inner margin, and three slender spines on the almost pointed apex; the outer plate widest distally, with nine long and three short spines round the serrate apical margin, those on the outer slope being the shortest.

Maxillipeds.—The inner plates short and rather broad, with convex outer margins,

not reaching halfway up the second joint, the inner margin ending in a small apical tooth, on the outer side of which, not projecting beyond it, is a small spine-tooth, and beyond this at the outer corner a slender seta; the large second joint is produced into a small almost conical plate about halfway along the first joint of the palp, with a spine at its apex, and a series of six or seven smaller spines along the inner margin of the joint; the first three joints of the palp are together but little longer than this joint; the first is rather longer than the second, and equal in length to the third; the spines on these joints are few; the finger is nearly as long as the third joint, broad at the base and narrow towards the end, with the inner margin pectinate like the corresponding finger in *Stenothoe adhærens*.

First Gnathopods.—Side-plates very small, convex in front, not quite concealed by the following pair. First joint attached at the lower end of the side-plate, not quite so long as the third, fourth, and fifth joints united, with two setæ about the middle of the front margin, and some apical cilia on the hind margin; the second joint short; the third as long as the wrist, with no free front margin, the hinder furred, the apex carrying a group of spines, of which one is much more conspicuous than the rest in size and pectination; the wrist is much shorter than the hand, distally squared, rather cup-like, with a spine on the hind margin like that at the apex of the preceding joint, besides two or three others not showing the same pectination; the hand is long and narrow, with a bend near the base of the front margin, which below the bend carries four spines and some apical setæ; the shorter hind margin is nearly straight, the proximal half naked, below which are four setæ, at the fourth of which begins a series of palmar spines, a single one followed by two pairs; the finger closing over the very oblique convex palm reaches with its tip the base of the second pair of spines; the palm shows very fine pectination, and is bordered by a few submarginal setæ and setules.

Second Gnathopods.—Side-plates more than twice as long as broad, the hind margin nearly straight, with some small spines in the serrations of the lower end, the front margin meeting the hinder with a continuous curve. Branchial vesicles so short and narrow as to seem rudimentary, unless accidentally aborted in the present specimen. The marsupial plates narrow, with ten or twelve setæ around the distal part. The first joint of the limb not reaching the end of the side-plate, equal in length to the third, fourth, and fifth joints together, with several setæ at the lower end of the front margin; the second joint with a small apical group of spines on the hind margin; the third joint shorter than the wrist, with a group of spines at the apex of the hind margin, and one spine higher up; the wrist much shorter than the hand, distally cup-like though narrow, both margins convex, the hind part produced beyond the front, furred, with an apical group of spines; the hand three times as long as broad, almost parallel-sided, a little widened at the palm, which is defined by one pair of spines, and along its margin has a second pair, together with a seta and some setules, all submarginal at their origin, the actual

palm-rim being almost smooth; the hind margin carries two or three setæ, the front two apical cilia; the finger with its point scarcely reaches the defining palmar spines; the dorsal cilium is near the base.

First Peræopods.—Side-plates nearly three times as long as broad, carrying spinules at the lower part of the hind margin. Branchial vesicles shorter than the first joint, much narrower than the side-plates. Marsupial plates longer but narrower than the branchial vesicles, with a few setæ round the lower part. The limbs like all the other peræopods, very slender; the first joint not reaching the end of the side-plate, the lower part of the front margin fringed with setæ; the third joint longer than the fourth or fifth, with setules at five points of the hinder, and two of the convex, slightly decurrent, front margin; the fourth joint shorter than the fifth; the finger more than half the length of the fifth joint, a little curved towards the acute tip; a dorsal cilium very near the base.

Second Peræopods.—Side-plates very deep, but broader than deep, forming as it were a triangle with the sides curved and the apex rounded off, reaching back to the pleon; the limb nearly as in the preceding pair; part of the third joint covered by the side-plate.

Third Peræopods.—Side-plates very small, not bilobed. Branchial vesicles scarcely longer than the side-plate, twice as long as broad. Marsupial plates a little longer than the branchial vesicles. The first joint not expanded, a little narrowed in the middle, with an apical spine on the apex of the front margin; the second joint with three spines along the front margin; the third joint with five in front and two behind; the fourth joint shorter than the third or fifth, with spines at two points in front and one at the apex behind; the fifth joint shorter than the third, with spines at three points in front, and setules at two points behind; the finger much more than half the length of the fifth joint.

Fourth Peræopods similar to the preceding, the first and second joints rather shorter, the remaining rather longer, the second and third with a spine or two less.

Fifth Peræopods.—The side-plates less deep; the limb similar to the preceding pair, but with the first four joints rather shorter.

Pleopods.—Coupling spines very short, straight, the apex forming a pair of teeth, with a lateral pair below; there appears to be only one cleft spine, long, with long unequal arms, placed at about the centre of the long first joint of the inner ramus; the joints of the rami numbering from eight to nine.

Uropods.—Peduncles of the first pair longer than the rami, the upper margin pectinate, carrying an apical spine; the rami (on one side of the specimen) equal (on the other with the inner shorter, less slender), acute, with pectinate margins, the outer with three, the inner with two, spinules; the peduncles of the second pair longer than the rami, with marginal spines on one of the upper edges, the rami similar to the preceding pair but shorter, the inner ramus with only one marginal spinule; the peduncles of the

third pair not much longer than the proximal division of the ramus, which carries three marginal spines, and is itself not much larger than the second joint or nail; these uropods reach back a little beyond the telson, but not so far as either the second or third pairs.

Telson long, more than twice as long as broad, with an acute apex.

Length.—The specimen, in the position figured, measured, from the front of the head to the apex of the first uropods, less than one-fifth of an inch.

Locality.—Station 149H, Cumberland Bay, Kerguelen, January 29, 1874; depth, 127 fathoms; bottom, volcanic mud. Three specimens.

Remarks.—The specimen described is a female.

The species is very like *Metopa nasuta*, Boeck, which also has the large beak or nose formed by the first joint of the upper antennæ. Hence the specific name is a hybrid, to express "of the lineage of *nasuta*." In Boeck's species, the beak of the upper antennæ does not quite reach the end of the second joint; the maxillipeds have the second joint only as long as the two following joints, and the finger much shorter than the preceding joint; the first gnathopods have the hand narrow and not subchelate; the second gnathopods and the peræopods have not the same proportions as in the Challenger species; for instance, in *Metopa nasuta* the fifth joint of the fifth peræopods is described as equalling in length the two preceding joints.

Metopa magellanica, n. sp. (Pl. XLI.).

Rostrum and lateral angles of the head inconspicuous; first three segments of the pleon with the points of the postero-lateral angles not produced; the fourth segment with a slight dorsal depression.

Eyes round.

Upper Antennæ.—First joint thicker but not much longer than the second; the third rather more than half as long as the second; the flagellum slender, tapering, rather longer than the peduncle, consisting of thirteen joints; there is a rudimentary two-jointed secondary flagellum, but it must not be supposed that this is as obvious in the specimen as it appears in the figure, where it is isolated from the numerous markings that are visible on and beneath the surface.

Lower Antennæ longer than the upper; first three joints very short, gland-cone very small; fourth joint long and slender, rather thicker and a little shorter than the fifth; the flagellum of eight joints rather shorter than the fifth joint of the peduncle; but perhaps one or two joints of the flagellum may be missing.

Upper Lip with the distal margin unsymmetrically bilobed.

Mandibles.—The cutting edge rather broad and angular, divided into ten denticles,

the upper five very small, the lower rather larger, the lowest but one flat-topped, perhaps accidentally; the secondary plate similar with fewer teeth, but neither were these nor the spine-row well made out; the palp with the first joint short, yet nearly as long as the third, the second joint long, with setæ on the upper part; the conical third joint with two apical setæ. The opposite mandible probably with the usual differences.

Lower Lip.—Mandibular processes apically rounded.

First Maxillæ.—Inner plate small, elliptical; outer plate strongly ciliated on the inner edge, the truncate distal margin carrying five spines, the two innermost long and slender, with a very short one submarginal by their side, the third slender, the fourth much stouter, the fifth the slenderest of all, these latter three being shorter than the first two; the palp, which is certainly two-jointed, has five spinules on the dentate oblique apical margin, and two setæ on the surface, of the second joint.

Second Maxillæ.—The inner plate shorter than the outer, with five or six slender spinules and spines distributed upon the inner and apical margins; the outer plate having about nine spines, chiefly on the rounded apex.

Maxillipeds.—The inner plates reaching halfway along the inner margin of the following joint, the apical margin sloping a little outwards and carrying two setules, the inner shorter than the outer; the second joint produced on the inner side into a small rudimentary plate with a seta at its apex; five or six more small setæ are distributed on or near the rest of the margin; the first and second joints of the palp are subequal, together scarcely longer than the preceding joint; the third joint rather longer than the second, armed like the two preceding joints with a few slender setæ or spines, and having the distal margin ciliated and produced over the base of the finger; the finger long, rather broad at the base, but rapidly narrowing, strongly ciliated or spined on the inner margin.

First Gnathopods.—The side-plates small, almost concealed by the following pair, the hind margin longer than the front, the lower oblique. The first joint attached at the lower extremity of the side-plate, subequal in length to the hand and wrist united, the front margin fringed with setæ, of which there are also a very few on the hind margin; the second joint has two apical spines behind; the third joint much longer than broad, narrowing to the blunt apex, which carries a group of spines, much of the hind margin furred; the wrist not quite so long as the hand, distally squared, the hind margin much shorter than the front, fringed with a few bent spines; some spines also on the surfaces, especially the inner; the front margin of the hand much longer than the hinder, the long, very oblique, finely pectinate palm defined by a pair of spines at the widest part of the hand; these are reached by the point of the long finger, which closes over a series of spinules and a second pair of spines; there are a couple of setæ on the hind margin, four or five crossing the inner surface diagonally, and others near the front margin, of which one pair are long; the dorsal cilium of the finger is near the base.

Second Gnathopods.—Side-plates almost semicircular. Branchial vesicles very small, much shorter than the first joint. Marsupial plates very broad, rounded, much shorter than the side-plates, very much broader than the first joint, with several long marginal setæ. The first joint reaching beyond the side-plate, about equal in length to the wrist and hand, carrying setæ on both margins; the second joint with some apical setæ behind; the third joint as long as the wrist, produced behind to a sharp apex, with a group of setæ above it and a row of three setæ higher up on the hind margin; the wrist much shorter than the hand, triangular, distally cup-like, the hind margin furred, the blunt apex carrying seven or eight spines; the front margin of the hand more than twice the length of the hind margin; the hand widest at the commencement of the very long and very oblique convex palm, along the commencement of which runs a row of spines set closely together, the remainder of the palm being fringed with some setules of various sizes; the curved finger, besides the dorsal cilium near the base, and one or two at the base of the nail, has four or five hairs along the otherwise smooth inner margin.

First Peræopods.—Side-plates broader above than below, both front and hind margins nearly straight. Branchial vesicles small, pear-shaped, not so long as the first joint of the limb. Marsupial plates very broad, not very long. First joint reaching below the side-plates; many setæ, some of them long ones, on the front margin, chiefly on the lower half; the third joint curved, longer than the fourth, equal to the fifth, a little decurrent in front; these joints have a few small spines and spinules on the margins; the finger long, thin, pointed and curved, more than half the length of the fifth joint.

Second Peræopods.—The side-plates of about equal depth and width, rounded behind. The branchial vesicles rather larger than the preceding pair; neither first nor second joint of the limb reaching below the side-plate; the third joint longer than either the fourth or fifth; the fifth longer than the fourth, each with four pairs of spines on the hind margin; the finger, like the rest of the limb, stouter than in the preceding pair, more curved; the inner margin smooth.

Third Peræopods.—Side-plates small, lobed behind. Marsupial plates very small. First joint not expanded, with a few spinules on the margins; third joint longer than fourth or fifth, with small spines at seven points of the front, and six of the slightly decurrent hind margin; fourth joint shorter than the fifth, with three groups of spines on the front margin; fifth joint with four groups; finger much more than half the length of the fifth joint.

Fourth Peræopods.—Side-plates similar to the preceding pair, but smaller. First joint of the limb ovoid, not much narrowed at either end, the sides almost entirely smooth; the rest of the limb scarcely differing from the preceding; the fourth joint has four groups of spines on the front margin.

Fifth Peræopods.—Side-plates small. First joint more dilated than in the preceding pair, with six or seven spinules on the front margin, the rounded lower margin behind overlapping the second joint; the rest of the limb as in the preceding pair.

Pleopods.—Coupling-spines very short and small, with an apical pair of teeth and a lateral pair; a single cleft spine below the centre of the first joint of the inner ramus; joints of the rami numbering from seven to nine.

Uropods.—Peduncles of the first pair not quite so long as the rami; the rami equal, the inner with two, the outer with three marginal spines; peduncles of the second pair shorter than the inner ramus; the outer ramus much shorter than the inner, each with pectinate upper edge, and two marginal spines; the peduncle of the third pair equal in length to the basal portion of the ramus, which is considerably longer than the apical portion or nail, and carries three marginal spines.

Telson not quite reaching the end of the peduncle of the third uropods, twice as long as broad, flat at the base, the sides almost parallel to below the centre, armed each with three spines, the lowest of which is the largest, then converging rapidly to an almost acute apex.

Length.—The specimen, in the position figured, measured, from the front of the head to the back of the third pleon-segment, three-twentieths of an inch.

Locality.—Station 313, off Cape Virgins, Patagonia, January 20, 1876; lat. 52° 20′ S., long. 67° 39′ W.; depth, 55 fathoms; bottom, sand; bottom temperature, 47°·8. One specimen; female. Trawled.

Remark.—The specific name alludes to the place of capture, the neighbourhood of the Strait of Magellan seeming to be particularly prolific in small species of Amphipoda.

Metopa crenatipalmata, n. sp. (Pl. XLII.).

Rostrum and lateral angles of the head inconspicuous; the first three segments of the pleon with the points of the postero-lateral angles not produced; the fourth segment with a slight dorsal depression.

Eyes round.

Upper Antennæ.—First joint thicker than the second but scarcely as long; third joint not half as long as the second; the flagellum of about twelve joints, the first as long as the third joint of the peduncle; apparently a rudimentary secondary flagellum is present.

Lower Antennæ longer than the upper. First three joints very short, gland-cone very small; fourth joint rather thicker and a little shorter than the fifth; the flagellum of eight joints longer than the fifth joint of the peduncle; the first joint of the flagellum

considerably longer than any of the others; one or two of the terminal joints apparently missing.

Upper Lip with the distal margin unsymmetrically bilobed.

Mandibles.—The cutting edge in one of the mandibles with four small denticles at the top and five larger ones below, in the other mandible with four small denticles above and four below, and three larger in the centre; the secondary plate and spine-row not clearly made out; the palp as in *Metopa magellanica*.

Lower Lip, *Maxillæ*, and *Maxillipeds* similar to those of *Metopa magellanica*, but in the present species, the first joint of the maxillipeds is much larger in proportion to the second joint than in the species just mentioned.

First Gnathopods.—Side-plates small, almost concealed by the following pair, broader above than below, with two spinules on the lower part of the front margin. The first joint attached at the lower end of the side-plate, fringed with setæ on both margins, a little widened distally, not equal in length to the hand and wrist united; the second, third, and fourth joints much as in *Metopa magellanica*, but the third joint, of which the lower part is furred, is broader in proportion to its length, while the wrist is narrower; the apical spines of the third joint are six in number, of which one is short, two are much longer, slender, geniculate, with accessory threads, and the other three are of unequal size but all feathered; there is similar variety in the spines on the hind margin and apex of the wrist, which is almost as long as the hand and rather broader, and has several spines on the surface; the hand resembles in armature that in *Metopa magellanica*, except that its palm-margin is finely crenulate instead of pectinate, the hind margin is longer and the palm proportionately shorter than in that species; the finger is finely pectinate on the inner margin, which forms a small denticle at the base of the nail, where there are two cilia, of which three more are spaced along the margin.

Second Gnathopods.—Side-plates tending to a semicircular form, but with the lower part much broader than the upper. Branchial vesicles as in *Metopa magellanica*. The marsupial plates long and broad. The first joint reaching beyond the side-plate, as long as the wrist and hand united, with setæ on the margins; the second joint short, with setæ at two points of the hind margin; the third joint as long as the short wrist, with setules at one or two points of the hind margin and a group of slender spines at its blunt apex; the wrist as in the preceding species; the hand broad, the front margin not twice as long as the hinder, which has setules at four points and is apically produced into a sharp tooth defining the palm; within this process are set two palmar spines, between which the nail of the very broad finger closes down against the process; the palm-border is crenulate in two divisions and fringed with spinules or setules; the inner margin of the finger is smooth, and much less convex than the outer; it has a dorsal cilium near the hinge and cilia at the base of the nail.

First Peræopods.—Side-plates broader below than above, front and hind margins

nearly straight. Branchial vesicles pear-shaped, much broader below than above, not as long as the first joint. Marsupial plates broad and long. First joint reaching a little beyond the side-plate, with setæ and setules along the margins; third joint longer than the fourth, shorter than the fifth, a little decurrent in front; there are a few setules and spinules on the margins and apices of these joints; the finger long, thin, pointed and curved, more than half the length of the fifth joint.

Second Peræopods.—Side-plates rather deeper than broad. Branchial vesicles pear-shaped, bent, as long as the first joint. Marsupial plates broad, not as long as the side-plates. Neither first nor second joint reaching the end of the side-plate; the third joint longer than either the fourth or the fifth; the fourth shorter than the fifth, each with four groups of spines on the hind margin; the finger broad, shorter than in the preceding pair, much curved at the tip, with the inner margin a little serrate.

Third Peræopods.—Side-plates deeper than broad. Branchial vesicles short, widest just below the neck. First joint of the limb not expanded above, but forming a rounded lobe below and behind which partially overlaps the second joint, with nine spinules on the hind margin, and five or six on the lower half of the front; second joint with spines at two points in front; third joint much broader as well as longer than the fourth or fifth, with spines at six points in front, and spinules at as many on the convex decurrent hind margin; the fourth joint shorter than the fifth, each with spines at four points of the front margin; the finger much more than half the length of the fifth joint, curved at the tip, the inner margin smooth.

Fourth Peræopods.—Side-plates similar to the preceding pair, but smaller. First joint evenly expanded or a little wider above than below, with a few spines along the front margin, the hinder almost completely smooth, the rounded lower margin partially overlapping the second joint behind; the third and fifth joints rather larger than in the third peræopods.

Fifth Peræopods.—The side-plates smaller than the preceding pair. The first joint wider than in the preceding pair, and behind quite overlapping the second joint; the third joint shorter in front than in the fourth peræopods; the finger with serrate inner margin.

Pleopods.—Coupling-spines seemingly minute; a single cleft spine on the inner ramus; joints of the rami seven to nine in number.

Uropods.—Peduncles of the first pair rather longer than the rami, with spines on the pectinate upper edges; inner ramus a little shorter than the outer, with two marginal spines, the outer with three, both with the upper edges pectinate; peduncles of the second pair subequal in length to the inner ramus; the outer ramus much shorter than the inner, with one marginal spine, the inner with two, both with pectinate upper edges; peduncles of the third pair a little shorter than the ramus, with four spines along the margin; the basal portion of the ramus shorter than the nail, carrying two spines on the upper margin, the upper edge of the nail pectinate.

Telson long oval, not nearly reaching the end of the peduncles of the third uropods, flattened at the top, with a rounded point at the apex, with three spines on each margin, the largest and lowest of which is a little below the centre.

Length.—The specimen, in the position figured, measured in a straight line from the front of the head to the back of the third pleon-segment, one-fifth of an inch.

Locality.—Station 313, off Cape Virgins, Patagonia, January 20, 1876; lat. 52° 20′ S., long. 67° 39′ W.; depth, 55 fathoms; bottom, sand; bottom temperature 47°·8. One specimen, female. Trawled.

Station 135c, off Nightingale Island, Tristan da Cunha, October 17, 1873; depth, 100–150 fathoms. One specimen, female, smaller than that from Station 313.

Remarks.—The careful comparison of the specimen from Station 313, point by point, with *Metopa magellanica*, from the same station, makes it clear that, in spite of some general resemblance, the two forms are specifically distinct.

The specific name alludes to the palm-margin of the second gnathopods.

Metopa parallelochelr, n. sp. (Pl. XLIII.).

Rostrum obsolete, lateral lobes of the head not very prominent; postero-lateral angles of the first three pleon-segments not acutely produced.

Eyes round, rather high up on the sides of the head.

Upper Antennæ.—First joint longer and thicker than the second; third joint about half the length of the second; flagellum of eight joints, together shorter than the peduncle, but one or two joints are probably missing; accessory flagellum rudimentary, very thin, two-jointed, tipped with setules, scarcely half as long as the first joint of the primary flagellum.

Lower Antennæ longer than the upper. First two joints very short, the third longer; the fourth and fifth elongate, the fifth more so than the fourth, both with several marginal setules; the flagellum of nine joints, together scarcely as long as the fifth joint of the flagellum, the first joint as long as the four following and much broader, its width irregular, one margin serrate and carrying setules at four points.

Upper Lip with the distal margin unsymmetrically bilobed.

Mandibles, so far as observed, agreeing with those of *Metopa crenatipalmata*.

Lower Lip.—The mandibular processes rather narrow.

First and *Second Maxillæ* not materially different from those of the two preceding species.

Maxillipeds like those of *Metopa crenatipalmata*, but with the inner plates shorter, and with two setæ close together on the apex of the rudimentary outer plate.

First Gnathopods.—Side-plates small, almost concealed. First joint shorter than the

hand and wrist united, narrow at the point of attachment, then evenly wide, with one seta at the middle of the front margin, and a few minute setules; the rest of the limb almost as in *Metopa crenatipalmata*, but with fewer spines on the inner surface of the wrist and hand, and the palm of the hand almost smooth.

Second Gnathopods.—Side-plates broad, the hind margin a little sinuous, the lower margin convex. Branchial vesicles very small, pear-shaped, much broader below than above. First joint of the limb nearly as broad, but scarcely longer than the hand, with small setules on the front margin, the hind margin having only an apical spinule; the second joint armed only at the hinder apex; the third joint having one or two spines or spinules on the hind margin and a small group on the bluntly-pointed apex; the wrist not longer than the third joint, distally cup-like, but narrow, furred behind, and carrying a couple of spines on the apex; the hand long and narrow, almost parallel-sided, with four setules on the hind margin, which is produced into a tooth at the palm, near to which is a group of palmar spines, among which the tip of the finger closes down, not reaching the process of the hind margin; the palm margin comparatively short, but oblique, set with numerous spinules, apparently quite smooth; the finger much curved, not very long, its inner margin seeming to be quite smooth; the dorsal cilium near the base.

First Peræopods.—Side-plates evenly oblong, not broader than the preceding pair. Branchial vesicles larger than the preceding pair, of more even width throughout, bent near the base. First joint reaching beyond the side-plate, the limb in general scarcely differing from the corresponding limb in *Metopa crenatipalmata*.

Second Peræopods.—These are similar to those in the species just named, with trifling differences of detail; the inner margin of the finger is smooth, not serrate.

The Third, Fourth, and *Fifth Peræopods* closely resemble those pairs in *Metopa crenatipalmata;* there is, however, more crenulation of the hind margin of the first joint of the fourth and fifth pairs in the present species, and the finger of the fifth pair has a smooth inner margin.

The Pleopods appear to agree with those of the preceding species, or to have a joint or two less in the rami.

Uropods.—Peduncles of the first pair longer than the rami; the rami of equal length, the outer with two marginal spines, the inner with one, both with the upper edges pectinate; peduncles of the second pair not quite so long as the inner ramus; the outer ramus much shorter than the inner, without spines, the inner ramus with one spine, both with pectinate upper edges; the peduncles of the third pair not so long as the ramus, the proximal portion of which is longer than the apical, and carries a small spine on the inner margin and two spines at its apex; the upper edge of both portions pectinate.

Telson similar to that of the preceding species, rather narrower, with two spines on the upper half of each lateral margin.

Length.—The specimen, in the position figured, measured, in a straight line from the front of the head to the back of the third pleon-segment, scarcely more than one-tenth of an inch.

Locality.—Station 313, off Cape Virgins, Patagonia, January 20, 1876; lat. 52° 20′ S., long. 67° 39′ W.; depth, 55 fathoms; bottom, sand; bottom temperature, 47°·8. The specimen was obtained, with perhaps one or two more, associated with *Metopa crenatipalmata*.

Remarks.—This species in many respects closely resembles *Metopa crenatipalmata*. Had the latter been the male, and the present specimen a female, the differences might have been regarded as merely sexual, but the species named *Metopa crenatipalmata* has the hand of the second gnathopod both stronger and more ornate than that found in *Metopa parallelochelr*.

The specific name alludes to the almost parallel sides of the hand in the second gnathopods, which give it a peculiarly straight and stiff appearance that is characteristic.

Metopa ovata, n. sp. (Pl. XLIV.).

Rostrum inconspicuous, lateral lobes of the head little prominent; the postero-lateral angles of the first three pleon-segments not acutely produced, but not rounded; the sixth segment of the pleon dorsally two-edged, as is probably the case in the other species.

Eyes round, near the front of the head.

Upper Antennæ.—First joint longer than broad, equal in length to the second and third united, the third not much shorter than the second, the flagellum longer than the peduncle, of ten joints, with cylinders rather longer than the joints; the secondary flagellum as usual rudimentary, two-jointed.

Lower Antennæ scarcely so long as the upper; first three joints very short, the first a little inflated, the gland-cone small, the fourth joint about equal to the first three united, broader than the fifth but not longer; the flagellum longer than the peduncle, ten- or eleven-jointed, shorter than the flagellum of the upper antennæ.

Upper Lip with the distal margin unsymmetrically bilobed.

Mandibles.—The cutting edge on the left mandible obtusely angled, divided into eight denticles, three small ones at the top followed by three larger in the middle, the next being rather flat-topped, and the lowest acute, as large as those in the centre; the secondary plate on the left mandible not so broad as the principal plate, with a slightly convex edge, cut into seven or eight denticles; the principal plate on the right mandible resembling that on the left, but with only seven denticles, the lowest but one very broad, the secondary plate scarcely denticulate, but with a separate tooth at the lower end; the

spine-row of six short denticulate spines, the first three pointing forwards; the palp very small, the first joint very short, the third joint probably occupying the short space between the apical seta and the seta on the inner margin below it, but I could not perceive any dividing line to mark off this from the second joint.

Lower Lip.—Mandibular processes short, apically narrow, divergent.

First Maxillæ.—The inner plate rather flat-topped, with one seta at the inner end of this margin; the outer plate as usual strongly ciliated on the inner margin, and with six spines in the usual arrangement and proportions on the distal margin, the innermost being finely pectinate, while the second and third are denticulate for a short space; the palp is two-jointed, as in the other species here described.

Second Maxillæ.—The inner plate shorter than the outer, with very fine setæ or spines on the apical margin.

Maxillipeds.—Inner plates reaching halfway along the inner margin of the second joint, the distal margin sloping a little outwards, with a small spine-tooth just within the inner apex, and a spinule near the outer corner; the second joint much longer than the first, with fine spinules along the inner margin, not spaced alike on the two members of the pair in the specimen examined, the rudimentary plate rather narrow; the first two joints of the palp short and broad, not longer than their breadth, the third joint a little longer, with adpressed cilia on the back, the outer margin very convex; the finger of the usual structure, but the narrow terminal part not elongated.

First Gnathopods.—Side-plates very small, completely covered by the following pair. First joint rather longer than wrist and hand united, narrowed at the base and distally, the front margin carrying a few setules, the hind margin of this and the following joint carrying an apical seta and setule; the third joint short, but as long as the wrist, the lower part behind strongly furred, the truncate apex armed with two spinules and two spines, one of which is distally serrate; the wrist triangular, distally cup-like, as broad as long, with a few spines on the hinder apex; the hand much longer than the wrist, tending to oblong, the longer and more convex front margin carrying three long spines at intervals, and on the apex a group of small setæ, the almost straight hind margin having one seta; the palm convex, not very oblique, very minutely pectinate, defined by a minute tooth at the apex of the hind margin, within which are two stout palmar spines and a long seta, followed by a few submarginal setules; the finger, with a dorsal cilium near the base, fits closely over the palm, the tip closing down between the two palmar spines.

Second Gnathopods.—Side-plates nearly semicircular, but rather more than twice as long as broad. Branchial vesicles very small, not half the length of the first joint, twice as long as broad. The marsupial plates considerably longer than the first joint, more than three times as long as broad, fringed with setæ. The first joint as long as the wrist and hand united, scarcely reaching the end of the side-plate, the margins fringed with

setules; the second, third, and fourth joints almost as in the first gnathopods, but the distal margin of the third joint wider, and the hind margin of the wrist a little longer; the hand two and a half times as long as broad, the front margin nearly straight, with one or two apical setules, the hind margin not much shorter than the front, carrying two small setæ, apically produced into a small tooth bending a little outwards so as a little to increase the width of the hand at this point; within this tooth is planted a palmar spine, with two larger spines of the same kind just beyond it, between which the tip of the finger closes; the palm-margin smooth, convex, scarcely oblique, fringed with setules; the finger smooth-edged.

First Peræopods.—Side-plates oblong, more than twice as long as broad. Branchial vesicles larger than the preceding pair, not so long as the first joint of the limb. Marsupial plates similar to the preceding pair. First joint not reaching to the end of the side-plate, fringed with setules; second joint longer than broad; third joint a little longer than the fourth, subequal to the fifth, with setules at four points behind, and at two in front, where it is slightly decurrent; the straight fourth joint with setules at two points of the hind margin; the fifth joint slightly curved, armed at three points of the hind margin; the finger curved, more than half as long as the fifth joint, having part of the inner margin pectinate.

Second Peræopods.—Side-plates deep, but much broader than deep, reaching back to the pleon-segments and completely covering the three following pairs of side-plates. The branchial vesicles and marsupial plates similar to those of the preceding segment. The first and second joints of the limb not reaching the lower rim of the side-plate; the third joint armed at five points, and the fourth at three points of the hind margin; the limb otherwise similar to that of the first peræopods.

Third Peræopods.—Side-plates very small, not bilobed. Branchial vesicles and marsupial plates very small, but deeper than the side-plates. First joint of the limb long and narrow, the margins fringed with setules, the upper part a little wider than the distal, and ciliated on the edges; the second joint with setules at two points of the front margin; the third joint longer than the fourth, rather shorter than the fifth, armed at three points in front and two behind, the fourth and fifth each at three points in front; the finger much curved, much more than half the length of the fifth joint, having part of the inner margin pectinate.

Fourth Peræopods.—Side-plates a little less deep than in the preceding pair. Branchial vesicles very small. The limbs very like the preceding peræopods, but with the four terminal joints longer, the second armed only at one point, the third and fourth at two points, of the front margin.

Fifth Peræopods.—Side-plates small, broader than deep. The first joint not wider above than below, shorter than in the two preceding pairs, the third joint also shorter, so as to be subequal in length to the fourth; the fifth joint rather longer than in the preceding pair.

Pleopods.—Coupling spines as usual minute, seemingly shaped as in the other species; a single long cleft spine at the middle of the long first joint of the inner ramus; in the third pair the inner ramus had but four joints, the outer ramus five.

Uropods.—Peduncles of the first pair rather longer than the rami, the upper edge pectinate, carrying one or two small spines; the inner ramus rather shorter than the outer, both with pectinate edges, and without spines; the second pair like the first, but stouter and shorter, the rami equal; the peduncles of the third pair scarcely longer than the proximal part of the ramus, carrying an apical spine; the ramus pectinate, with an apical spine to the proximal part, which is rather longer than the nail.

Telson not clearly made out, but probably equal in length to the peduncles of the third uropods, narrow at the apex, the length not equal to twice the greatest breadth.

Length.—The specimen, in the position figured, measured from the front of the head to the back of the second pleon-segment, one-tenth of an inch.

Locality.—Station 313, off Cape Virgins, Patagonia, January 20, 1876; lat. 52° 20′ S., long. 69° 39′ W.; depth, 55 fathoms; bottom, sand; bottom temperature, 47°·8. One specimen; female.

Remarks.—The specific name refers to the shape of the animal with the pleon folded as in the figure, which is probably its ordinary position when at rest. By the narrowness of the first joint in the fourth and fifth peræopods this species is allied to *Metopa nasuta*, Boeck, *Metopa longimana*, Boeck, and *Metopa nasutigenes* of this Report.

Metopa compacta, n. sp. (Pl. XLV.).

Lateral lobes of the head a little prominent, postero-lateral angles of the first three pleon-segments rounded or blunt.

Eyes round.

Upper Antennæ.—First joint longer than broad, longer than the second; third joint longer than half the second; flagellum of ten joints, together shorter than the peduncle, several of them with cylinders longer than the joints; secondary flagellum minute, two-jointed, about half as long as the short first joint of the primary flagellum, tipped with two setules.

Lower Antennæ very little longer than the upper; first three joints very short; fourth joint about as long as the first of the upper antennæ, rather longer than the joint which follows, both with several setæ upon the surface; the flagellum short, tapering, consisting of eight joints, together shorter than the flagellum of the upper antennæ, longer than the fifth joint of their own peduncle.

Upper Lip broadly and unsymmetrically bilobed.

Mandibles.—Cutting plate of the left mandible with the edge forming an obtuse angle, cut into eleven denticles, the six uppermost being the smallest, the three following the largest; the secondary plate nearly, if not quite, as broad as the principal, its edge gently convex, cut into about eighteen minute equal denticles; the principal plate on the right mandible scarcely differing from that on the left, the secondary plate with a straight edge and smaller denticles; spine-row of three short serrate spines and a group of five, that seem to be smooth and not in line with the others; the first joint of the palp shorter than the short third joint; the second joint broad, with a small spine near the middle of the inner margin, and a longer one near its apex, the distal margin flat, slightly oblique; the third joint abruptly narrower, rather more than a third of the length of the second joint, with two long apical spines.

Lower Lip very broad, principal lobes with the distal margin well ciliated; mandibular processes apically rounded.

First Maxillæ.—Inner plate with one seta on the narrowly rounded apex; outer plate with the usual spines a little elongate; the two-jointed palp as in other species.

Second Maxillæ with the plates rather broad, the longer outer one having many spines on the distal margin.

Maxillipeds.—The inner plates broad, reaching more than halfway along the inner margin of the second joint, carrying a short spine and one somewhat longer on the slightly curved distal margin; the broad second joint has some six spines on the inner margin, the longest being on the rounded apex of the rudimentary plate; the joints of the palp are about equal in length, the first two broader than the third, with some rather strong spines; the third joint has many adpressed cilia on the outer distal part, and four spines at and near the inner apex, of which one is long, with the distal half pectinate; the finger is of the usual type.

First Gnathopods.—Side-plates small, nearly concealed by the following pair, the front margin considerably shorter than the hinder, the oblique lower margin having two or three small spines. The first joint attached as usual, about equal in length to wrist and hand united, broad, fringed on both margins with long setæ, those behind being spine-like; the short second joint with a group of long and short spines; third joint shorter than the wrist, the front margin convex, the hind margin straight, furred below, the distal margin set with a row of seven or eight strong spines, which have the distal half pectinate; the wrist as long as the hand, with about a dozen strong pectinate spines round the hinder and part of the distal margin, and some long slender spines on the surface; the hand widest at the commencement of the palm, the hind margin unarmed, the palm convex, rather oblique, finely pectinate and denticulate, fringed with setules, and having a long seta at the centre and another at the commencement, where there are a row of palmar spines, three pairs and a single one; the front margin has a spinule near the middle and at a little distance from the apex three strong spines on the surface, this

part of the hand seeming to have armature in all the species; the outer margin of the finger forms a very regular curve, and has a long dorsal cilium near the base, the inner margin is less convex, pectinate, and carries six cilia or setules, the two longest at the base of the nail.

Second Gnathopods.—Side-plates very broad, especially below, the front margin forming a continuous curve with the broad lower margin. The branchial vesicles not so small as in some of the species, pear-shaped, broader than the first joint but not so long. Marsupial plates almost circular, as broad as the side-plates, the distal half fringed with setæ. The first joint of the limb just reaching below the side-plate, fringed as in the first gnathopods; the second joint having a spine on the hind margin above the apical group; the third joint having the front margin short, with a blunt apex, the hind margin longer, with spines at two points, and a group across the almost acute apex; the wrist shorter than the hand, broader than long, not as in the first pair longer than broad, distally cup-like, furred behind, and having at the apex eight pectinate spines; the hand strong, broadest at the palm, there exceeding the breadth of the wrist; the hind margin produced into a small tooth which defines the broad, finely denticulate palm; within the process of the hind margin is a group of seven palmar spines, the palm being also fringed with setæ and setules, some of the former being moreover studded about the surface of the hand; the finger as in the first gnathopods, except that the inner margin is not pectinate.

First Peræopods.—Side-plates large, oblong, with the front and lower margins a little convex, and the upper a little oblique. Branchial vesicles like those of the preceding segment, but larger. Marsupial plates similar to the preceding pair. First joint of the limb just reaching below the side-plate, the front margin carrying setæ, the hinder a few setules; the third joint longer than the fourth or fifth, with four setules on the straight hind margin, a spine near the top and another on the slightly decurrent apex of the front margin; the fourth joint with a couple of spinules on the hind margin, and a long spine at its apex; the fifth joint longer than the fourth, nearly as long as the third, narrowing distally, with spinules at three or four points of the straight hind margin; the finger short, much curved, about half the length of the fifth joint. The peræopods in this species are of stouter build than in the others that have been described.

Second Peræopods.—Side-plates large, broader than deep, of almost uniform depth for the first half, broadly rounded behind. The limb similar to that of the preceding pair.

Third Peræopods.—The side-plates rather deeply lobed behind. The branchial vesicles and marsupial plates deeper and broader than the lobe of the side-plate. The first joint of the limb not winged, distally a little widened, fringed on both margins with spinules, behind with a small distal lobe partially overlapping the short second joint; the third joint longer than the fourth or fifth, with spines at three points of the convex hind margin, and a group on the decurrent apex; the fourth joint short, with an apical group

of spines in front; the fifth joint and finger much as in the preceding peræopods, but the joint rather shorter, the finger a little longer.

Fourth Peræopods.—The side-plates similar to the preceding pair, but less broad. The first joint broadly and evenly expanded, the front margin not very convex, fringed with spinules, the hinder convex, almost smooth; the rest of the limb like the third pair, the third joint rather more decurrent, the fifth rather larger in both length and breadth.

Fifth Peræopods.—The side-plates small, but as usual rather deeper behind than in front. The first joint larger than in the preceding pair, the front margin more convex, the lower margin behind completely instead of partially overlapping the second joint; the remainder of the limb not materially different, but the fifth joint and finger rather smaller; in one member of the pair the fourth and fifth joints and finger were much smaller than in the fellow limb, the fourth joint being completely overlapped by the apex of the third.

Pleopods.—Coupling spines slender, curved, with the usual hooks; a single cleft spine on the inner ramus; six joints to the inner, and eight joints to the outer, ramus of the third pair.

Uropods.—Peduncles of the first pair much longer than the rami, fringed with spines; the rami equal, pectinate on the upper edges, the inner carrying two spines, the outer one; peduncles of the second pair about as long as the longer ramus; both rami with pectinate edges, the shorter with a marginal spine; the peduncles of the third pair as long as the proximal portion of the ramus, with an apical spine, and a second higher up; the proximal portion of the ramus much longer than the nail, carrying an apical spine, and a smaller one on the surface.

Telson very broad, longer than broad, apically converging to a rounded point; near each lateral margin there are three small spines, the middle one being at about the centre of the margin.

Length.—The specimen, in the position figured, measured, from the front of the head to the back of the second pleon-segment, a little under one-fifth of an inch.

Locality.—Station 313, off Cape Virgins, Patagonia, January 20, 1876; lat. 52° 20′ S., long. 67° 39′ W.; depth, 55 fathoms; bottom, sand; bottom temperature, 47°·8. One specimen, female.

Remarks.—A total of five species of *Metopa* were obtained at this one station, the rest of the voyage yielding but one other.

The specific name refers to the compactness and comparative solidity of this species, both in the parts of the animal and its whole figure.

The figure lettered *par.* represents a parasite which infests this specimen, especially about the telson and uropods.

Family Leucothoidæ.

In 1852 Dana[1] established the Leucothoinæ as subfamily 3 of the family Gammaridæ. In it he includes the genera *Stenothoe* and *Leucothoe*, of which the former was placed by Spence Bate in the subfamily Stegocephalides, the latter in the subfamily Gammarides. Lilljeborg in 1865 adopts Dana's subfamily, writing the name Leucothoina, and adding the genera *Pleustes*, Spence Bate, and *Montagua*, Spence Bate. In 1874 Boeck adopted the name "Leucothoinæ, Dana," as the name of the ninth subfamily of the Gammaridæ, and in 1876 as the sixth subfamily of the Leucothoidæ. In it he placed the genera *Liljeborgia*, Spence Bate, *Eusirus*, Kroyer, *Leucothoë*, Leach, *Tritropis*, Boeck, and *Pleustes*, Spence Bate.[2] The last of these genera was transferred to this subfamily by an afterthought, and Boeck's own account of the first side-plates, the third uropods, and the telson in species of *Pleustes* does not agree with his definition of the subfamily. In 1882 Sars adopted the name Leucothoidæ for a family containing the genera *Leucothoë*, *Tritropis*, *Eusirus*, "*Lilljeborgia*," presumably therefore corresponding with Boeck's Leucothoinæ, minus the genus *Pleustes*, which Sars places in the family Paramphithoidæ. Why Spence Bate and Boeck and Sars have removed *Leucothoë* from its proximity to *Stenothoë* I do not understand. In *Leucothoë* the third uropods are biramous, in the Stenothoidæ uniramous, but the mouth-organs bring the former near to the latter, as Dana and Lilljeborg have evidently felt. Gerstaecker in 1886 places *Leucothoë* next to *Stenothoë*. Costa in 1857 assigns to the Leucotoini only the genus *Leucothoë*, and I am so far in agreement with him that I have not seen reason to place in this family the other genera assigned to it by Boeck. It must be remembered that the loosely defined family, Leucothoidæ, Boeck, in which there is scarcely a single fixed character (almost everything mentioned being either large *or small*, present *or absent*), is quite distinct from the subfamily Leucothoinæ here changed into the family Leucothoidæ in accordance with the precedent set by G. O. Sars.

Genus *Leucothoë*, Leach, 1813.

1813. *Leucothöe*, Leach, Edin. Encycl., vol. vii. pp. 403, 432.
1815. „ Leach, Trans. Linn. Soc. Lond., vol. xi.
1816. *Lycesta*, Savigny, Mém. sur les Anim. sans vert., 1re partie, p. 109.
1825. *Leucothoe*, Desmarest, Consid. gén. sur les Crust., p. 263.
1829. „ Latreille, Le règne anim., t. iv.
1830. „ Milne-Edwards, Ann. d. Sci. Nat., t. xx. p. 380 (29).
1840. „ Lucas, Hist. Nat. des Crust., p. 230.
1840. „ Milne-Edwards, Hist. des Crust., t. iii. p. 56.
1852. „ Dana, U.S. Explor. Exped., vol. xiii. pt. ii. p. 909.
1853. „ Costa, Rend. d. Soc. r. Borb. Acad. di scienze.
1855. „ Gosse, Manual of Marine Zoology.

[1] See Notes on Dana, pp. 257, 261.

[2] See De Skand. og Arkt. Amph., p. 496.

1855. *Leucothoë*, Liljeborg, Öfv. af Kongl. Vet.-Akad. Förh.
1857. ,, Spence Bate, Ann. and Mag. Nat. Hist., ser. 2, vol. xix.
1857. ,, White, Popular Hist. Brit. Crust., p. 188.
1859. ,, Bruzelius, Skand. Amph. Gamm., p. 95.
1860. ,, Boeck, Forh. ved. de Skand. Naturf., 8de Møde.
1862. ,, Spence Bate, Brit. Mus. Catal. Amph. Crust., p. 156.
1862. ,, Bate and Westwood, Brit. Sess. Crust., p. 269.
1865. ,, Lilljeborg, On the Lysianassa Magellanica, p. 18.
1870. ,, Boeck, Crust. amph. bor. et arct., p. 77.
1876. ,, Boeck, De Skand. og Arkt. Amph., p. 506.
1882. ,, Haswell, Catal. Australian Crust., p. 247.
1886. ,, Gerstaecker, Bronn's Klassen und Ordnungen, Bd. v. Abth. ii. p. 506.

For the original definition see Note on Leach, 1813 (p. 84). Boeck's definition is as follows :—

"*Mandibles* apically much dilated and dentate ; molar tubercle wanting.

"*First Maxillæ* with the inner plate very small.

"*Maxillipeds* with the outer plate almost obsolete.

"*Upper Antennæ* without an accessory flagellum.

"*First Gnathopods* with wrist ovate, at the lower hinder angle produced into a long, slender, curved, acuminate process ; the hand elongate, linear, armed with spines on the hind margin.

"*Second Gnathopods* having a long heel to the wrist; the hand very large, sub-chelate.

"The *Peræopods* slender.

"*Third Uropods* with a tolerably long peduncle.

"*Telson* not cleft."

A rudimentary secondary flagellum is present on the upper antennæ, at least in some species of the genus.

Leucothoë miersi, n. sp. (Pl. XLVI.).

Rostrum minute, lateral lobes of the head prominent ; the postero-lateral angles of the first three pleon-segments scarcely acute.

Eyes oval, situated near the lateral lobes of the head, light-coloured in the specimen preserved in spirit, the ocelli small.

Upper Antennæ.—First and second joints long, subequal in length, the first with a small apical tooth, the second fringed with a few setules ; the third narrow, about one-fourth the length of the second ; the flagellum slender, shorter than the peduncle, with seventeen joints on one antenna, and twenty-one on the other in the specimen here described, the distal joints much longer than those at the base ; the secondary flagellum a small rudiment, consisting of a single joint, much shorter than the short first joint of the primary.

Lower Antennæ.—First joint a little dilated, the gland-cone of the second short and broad, decurrent, the canal within the cone wider than usual, appearing to be surrounded with sphincter muscles; the third joint much longer than broad, a little curved, armed with spines; the fourth joint much longer than the fifth, longer than the first joint of the upper antennæ, its upper margin fringed with setules and having some spines at the upper part; the fifth joint shorter than the first joint of the upper antennæ, the straight margins fringed with setules; the flagellum slender, shorter than the fifth joint of the peduncle, consisting of twelve joints.

Epistome very sharply pointed.

Upper Lip with the front margin very unsymmetrically bilobed, the longer and narrower lobe smooth, the rest of the margin fringed with long wiry cilia.

Mandibles.—The cutting plate widening at the cutting edge, divided into five strong teeth, the two uppermost on the left mandible being flattened and to some extent subdivided; the secondary plate on the left mandible has its widened edge divided into ten teeth, of which the sixth from the top and the lowest are the most prominent; the uppermost tooth on the principal plate of the right mandible is divided into five denticles, the secondary plate is very small, almost triangular, placed near and not exceeding in width the uppermost tooth of the principal plate, its distal border cut into twenty denticles, the lower part having also two rows of submarginal denticles; the spine-row consists of many large curved spines, the largest nearest the cutting edge; twenty-nine were counted on the left and thirty-four on the right mandible; no trace of molar tubercle; palp slender, first joint very short, much broader than the second; second very long, carrying numerous long spines which seem to be almost but not quite smooth; the third short and thin, about a quarter the length of the second, tipped with a couple of spines.

Lower Lip not well observed; the texture very thin.

First Maxillæ.—Inner plate small, oval, with a seta on the inner margin just below the apex; outer plate with a row of setæ at the top of the inner margin, the apical spines seven in number, two of them short, several (perhaps all except the outermost) having a single lateral denticle, which in one or two is large; the first joint of the palp fully half as long as the second; the second reaching beyond the outer plate, its inner margin straight, the outer convex, the narrowed apex carrying four rather long spines, two of which are apically curved.

Second Maxillæ.—Inner plates much broader than the outer, with three spines on the inner margin, and six on the broad distal margin, together with two that are submarginal, one very small and one very large; the spines are spaced, stiff, not setiform; the outer plate does not reach beyond the inner, it has three strong spines on the narrow apex, and the convex outer margin strongly ciliated.

Maxillipeds.—The inner plates almost as broad as long, reaching halfway up the

second joint of the maxillipeds, carrying two spines on a fold of the inner surface, one on the middle of the fold's distal margin, the other below its inner apex; the distal margin of the plate broad, a little sculptured for three spine-teeth, of which two are near the inner and one near the outer apex; the second joint dilated on the distal part of the outer side, where it carries many spines on the apical border, and one or two on the outer border below the apex; on the inside the joint is produced into a quite rudimentary plate, almost conical, with two spine-teeth on the inner margin, one at, the other just below, the apex; the first joint of the palp longer than the second, with many spines along both margins and on the outer apex; the second joint with spines along the inner margin and the inner surface near this margin, and with one spine on the outer apex; the third joint as long as the second, the outer apex forming a ciliated cap over the hinge of the finger; there are spines about the apex both at front and back; the finger is nearly as long as the third joint, with a small dorsal cilium not far from the base, a short curved nail, and the inner margin closely furred with cilia.

First Gnathopods.—Side-plates wider below than above, the lower corner in front produced over the base of the upper antennæ. The first joint long, reaching far below the side-plates, distally narrowing a little, the margins more or less fringed with setules; the second joint longer than broad, with setules on or near the hind margin; the third joint very inconspicuous, much smaller than the second, the apex pointed, lying on the wrist; the wrist much longer than the hand, longer than the first joint, the basal part forming a great bulb, from which the long narrow heel is produced behind, apically curving over the outer margin of the finger (when closed) almost to its base; the inner edge set with small hairs at intervals, rounded and lined with innumerable scale-like minute tubercles recalling to mind the palate of a dog-fish; the hand is narrowly oblong, about as long as the calx or produced portion of the wrist, the hind margin very finely serrate with a beaded appearance, set with small hairs, and the distal half having eight small spines, to the seventh of which the tip of the slender curved finger reaches, the hand margin being at this part gently curved for what may be considered as the palm, though it is continuous with the straight portion of the hind margin; the finger half the length of the hand.

Second Gnathopods.—Side-plates squared, but with the corners rounded, the breadth rather greater than the depth. The branchial vesicles rather longer than the first joint and of about the same breadth. The marsupial plates as long as the first joint, much narrower, fringed with long setæ. The first joint broad, reaching much below the side-plates, much shorter and narrower than the hand, with some spinules on the margins, and setæ on the inner side of the apex; the second, third and fourth joints are all channelled in front, and combine to form a sort of irregular cup for the hand; the second joint has the hind margin smooth, and a pointed apex in front on the outer side; the third, which is not longer than the second, has a pointed apex in front on the inner side; the wrist is produced along the hind margin of the hand as far as the palm, this long heel or process

being the chief part of the joint, its distal margin truncate and at the corners serrate, its hinder surface thickly set with groups of spines; the margins serrate; the hand very large, its long convex front margin smooth, ending in a sharp apex to which several setæ are attached; the hind margin apart from the palm scarcely more than a third the length of the front; the long convex palm is serrate, more and more deeply as it approaches the hinge of the finger, which is strong, curved, closing over the palm and reaching a small pocket on the inner surface of the hand just above the palm margin; a row of setæ traverses the hand's inner surface from the base across to the hinge of the finger.

First Peræopods.—Side-plates deeper than broad, less broad than the preceding pair, hind margin longer than the front, both convex, lower margin straight (see fig. *pr. segm.* 3). Branchial vesicles as long as the first joint but much broader, widening distally. The marsupial plates a little longer than the first joint, of the same width with it, fringed with long setæ. The limb narrow, the first joint reaching much beyond the side-plate, almost unarmed; second joint short; third joint longer than the fourth or fifth, with the apex in front sharp, decurrent, armed with a spine, toothed on the inner side; the fourth joint shorter than the fifth, with some minute marginal spines; the fifth joint with a row of fourteen very small spines on the straight hind margin; the finger sharply pointed, not half the length of the fifth joint.

Second Peræopods.—The side-plates broader than the preceding at the point where the hind margin forms its rounded angle, the upper part of the margin being very slightly concave, and the longer lower part as slightly convex. The branchial vesicles broader than in the preceding pair; the marsupial plates and the limb in agreement with that pair.

Third Peræopods.—The side-plates broader than the preceding pair, the hind lobe rather deeper and less broad than the front. The branchial vesicles very broad distally, larger than the first joint of the limb. The marsupial plates rather shorter than the preceding pair. The first joint of the limb oval, much narrower below than above, with much of the front margin flattened, fringed with about a dozen very small spines, the convex hind margin almost imperceptibly serrate; the second joint short; the third joint subequal in length to the fifth, the apex behind sharp, minutely bidentate, with two little apical spines; there are one or two little spines high up on the hind margin, and four or five on the front; the fourth joint, which is much shorter than the fifth, has spines at five points of the front margin; the fifth joint has spines at twelve points; the finger is curved, sharply pointed, about half the length of the fifth joint.

Fourth Peræopods.—Side-plates less broad than the preceding pair, the hind lobe a good deal deeper than the front, the front margin straight. The branchial vesicles at the centre nearly as broad as long. The first three joints of the limb similar to those of the preceding pair but larger, the front margin of the first joint more, and the hind margin less, convex than in that pair. The remainder of the limb missing.

Fifth Peræopods.—The side-plates small, straight above, otherwise tending to circular in shape. The first three joints of the limb as in the preceding pair, but rather longer, the first joint also rather wider in the upper part. The rest of the limb missing.

Pleopods.—The coupling spines are small but strong, stout at the base, the shaft having on each side in one spine two or three, in the other three or four, retroverted teeth, besides the two formed by the apex; there is but a single cleft spine, the arms of which are long; the first joint of the inner ramus carries plumose setæ below the cleft spine; fifteen joints were counted on the inner ramus, and seventeen on the outer.

Uropods.—The peduncles of the first pair reaching beyond those of the second, but not nearly so far as those of the third, subequal in length to the rami; the rami long, subequal, reaching back nearly to the end of the rami of the third pair, the outer slightly shorter than the inner, not spined along the inner margin, but with fifteen or more spines on the outer; the inner ramus spined along both margins; both rami apically acute; the peduncles of the second pair as long as the inner ramus, which is considerably longer than the outer, spined on both margins, while the outer, which is equally acute, has only a few spines on the outer margin; the peduncles of the third pair much longer than the rami, carinate above, with a few spines along the upper margin; the rami subequal, lanceolate, the adjacent margins in each pair a little convex, with spines only on the lower part, the remote margins straight and spined all along.

Telson very long and narrow, reaching just beyond the peduncles of the first uropods, armed just above its acute tip with two microscopic cilia or setules.

Length.—The specimen, in the position figured, measured, in a straight line from the rostrum to the dorsal apex of the third pleon-segment, a little over two-fifths of an inch.

Locality.—Station 142, off Cape Agulhas, December 18, 1873; lat. 35° 4′ S., long. 18° 37′ E.; depth, 150 fathoms; bottom, green sand; bottom temperature, 47°·0. One specimen, female. Dredged.

Remarks.—The specific name is given in compliment to Mr. E. J. Miers, whose meritorious labours as a carcinologist are well known.

With *Leucothoë commensalis*, Haswell, from Port Jackson, the present species has many points of resemblance. Mr. Haswell accepts the suggestion of Mr. Miers that his species is only a well-marked variety of the European *Leucothoë spinicarpa* of Abildgaard. A specimen for which I am indebted to Mr. Haswell's kindness shows the following points of difference from *Leucothoë miersi*; in the mandibles the secondary plate on the left mandible has its edge divided into eight broad teeth, the spines of the spine-row seem to be less numerous, the third joint of the palp is longer and curved; the first joint of the palp in the first maxillæ has greater width; in the maxillipeds the relative sizes of the various joints are different, the inner plates are differently shaped, their texture

and spines stronger, the rudimentary outer plates are smaller; in the second gnathopods the hand is longer in proportion to its breadth, and the first joint of the limb longer in proportion to the other joints; the peduncles of the third uropods are less elongate in comparison with the rami, and the long narrow telson is far less sharply pointed, or rather has the narrow apex rounded. There are other points of difference which a minute description of the whole animal would display.

Leucothoë tridens, n. sp. (Pl. XLVII.).

The first three segments of the pleon with the postero-lateral angles scarcely acute; those of the second segment in this, as in the preceding species, perhaps having a little produced point.

Eyes between round and oval in shape, dark in the specimen preserved in spirits.

Upper Antennæ.—The first joint not longer than the second, having a very small apical tooth; the second joint with a small spine near the middle of the upper margin, and a feathered cilium or seta at the apex of the lower; the third joint nearly half the length of the second; the flagellum very short, with five joints remaining, probably not more than one or two missing, the first the shortest, and the minute narrow secondary flagellum shorter than this.

Lower Antennæ.—Similar in proportions to those of *Leucothoë miersi;* the flagellum consisting of only six slender joints.

Upper Lip narrow, very unequally bilobed, finely fringed with cilia except at the apex of the longer lobe.

Mandibles.—The cutting-plates nearly as in *Leucothoë miersi;* the spines of the spine-row much less numerous; the second joint of the palp with two pairs of spines near the middle of the front margin and one at its apex, the third joint a little more than half the length of the second, with two spines or setæ on its narrow apex.

Lower Lip of very thin texture, the cilia few on the rounded distal margins of the principal lobes.

First Maxillæ.—Inner plates small, oval, with a very small apical seta; the seven spines on the distal margin of the outer plate similar to those in *Leucothoë miersi*, the lateral denticle not large on any of them, the setæ at the apex of the inner margin not large; the palp as in the other species.

Second Maxillæ.—The inner plate broader than the outer, with two small spines on the apex and one on the inner margin just below the apex; the outer plate reaching a little beyond the inner, with two apical spines, and a seta on the outer margin just below the apex.

Maxillipeds.—The rudimentary plate of the second joint appears to be extremely small; the joint has spines on the outer apex, and two on the margin below; the first

joint of the palp is short and broad, with spines on the inner margin and outer apex, the second joint is a little longer, similarly armed; the third joint is as long as the second, with apical spines, not produced at the outer apex; the finger is as long as the third joint, with a short sharp nail, and the inner margin ciliated.

The triturating organ of the stomach has half of its oval fringed with seventeen unequal spines, each of which has two rows of spinules.

First Gnathopods.—Side-plates broader below than above, the front lower corner produced, but not reaching the antennæ, the flat lower margin forming more of an angle with the front margin than in the preceding species, the serrations at the lower part of the front margin more marked. The first joint much shorter than the wrist, the margins smooth, the front nearly straight, the hind gently convex; the second and third joints as in *Leucothoë miersi*, the third with two setæ at the apex; the process of the wrist prolonged quite round to the hinge of the finger, thin on both margins, which have a few hairs at intervals; the hand with four to six spines on the distal half of the finely serrate inner margin; the finger short, about one third the length of the hand, not reaching the two uppermost spines.

Second Gnathopods.—These do not differ very strikingly from those of *Leucothoë miersi*. The straight hind margin of the side-plate is a little serrate. The hind margin of the second joint has some groups of setules; the distal margin of the wrist is cut into five distinct denticles, and one of its inner margins is without any serration, the hand has two or three rows of spinules not very closely set on each surface near the palm border, but is without the transverse row of setæ on the inner surface, although there are some groups towards the hinge of the finger; the apex of the front margin is not sharply pointed.

First Peræopods.—Side-plates nearly square, a little deeper than broad. The branchial vesicles narrowly oval, not so long as the first joint, the marsupial plates about as long as the branchial vesicles, narrower, fringed with long setæ. The first joint widening a little distally, with the front margin concave, the hinder convex, both fringed with spinules; the relative proportions of the third, fourth, and fifth joints as in *Leucothoë miersi*, the third joint with a spine at the upper, another at the lower part of the hind margin, and a third at the apex, the fourth joint with three, and the fifth with four, little spines on the hind margin; the finger more than half the length of the fifth joint.

Second Peræopods.—The side-plates four-sided, the hind margin shorter than the front; the lower margin has two little notches indicating the portion perhaps which technically should be reckoned as hind margin. The branchial vesicles rather larger than the preceding pair, the marsupial plates and the joints of the limb not showing any material difference.

Third Peræopods.—Side-plates with the front lobe wider and rather deeper than the hinder one. The branchial vesicles rather longer than the first joint, but not so broad.

The marsupial plates as long as the branchial vesicles, but much narrower. The first joint not very wide, oblong-oval, with about a dozen small spines along the nearly straight front margin, and seven or eight minute serrations on the hinder; the third joint is longer than the fourth, apically decurrent behind, and with a spine on the hind margin; the fourth joint has two small spines on the front margin; the fifth joint subequal in length to the third, has five small spines along the front margin; the finger is more than half its length.

Fourth Peræopods.—The side-plates much narrower than the preceding pair, the hind lobe rather deeper than the front. The branchial vesicles and the limb similar to those of the third peræopods, but with the first, third and fifth joints larger.

Fifth Peræopods.—Side-plates small, broader than deep, not bilobed. The limb as in the preceding pair, but with all the joints, except the second, longer, and the first joint more oval.

Pleopods.—The coupling spines are similar in structure to those of the preceding species, but with the lateral teeth numbering only from two to three; the cleft spine single; the joints of the rami about eight or nine in number.

Uropods.—Peduncles of the first pair subequal in length to the long narrow rami, which have a few spines on the outer margin; the outer ramus a little shorter than the inner; peduncles of the second pair not reaching so far as those of the first, about as long as the inner ramus; the outer ramus a good deal shorter than the inner; the peduncles of the third pair longer than the rami, the inner margin apically pointed and carrying a few marginal spines, the longer ramus with five marginal spines, the shorter and narrower with only three.

Telson reaching beyond the peduncles of the first uropods, not so long in proportion to its breadth at the base as in *Leucothoë miersi*, the minute apex microscopically tridentate.

Length.—The specimen, in the position figured, measured, in a straight line from the rostrum to the apex of the third uropods, one-fifth of an inch.

Locality.—Station 168, off New Zealand, July 8, 1874; lat. 40° 28′ S., long. 177° 43′ E.; depth, 1100 fathoms; bottom, blue mud; bottom temperature, 37°·2. One specimen, female. Trawled.

Remark.—The specific name refers to the tridentate apex of the telson, but this is a character difficult to observe and not one on which much stress can be laid.

Leucothoë flindersi, n. sp. (Pl. XLVIII.).

The first pleon-segment with the postero-lateral angles minutely pointed, but with the hind margin bulging out beyond the points; the second pleon-segment with the angles pointed, not produced beyond the hind margins.

Eyes oval.

Upper Antennæ.—The first joint about equal in length to the next two united, not twice as long as broad; the third joint much more than half the length of the second; the flagellum tapering, of five joints, together shorter than the first joint of the peduncle; the third joint of the peduncle and the first four of the flagellum carrying long cylinders; the secondary flagellum minute, not longer than broad.

Lower Antennæ.—First three joints short, the first dilated, the fourth as long as the three preceding united, the fifth rather shorter; the flagellum tapering, of four joints, together equalling the length of the fifth joint of the peduncle.

Upper Lip comparatively broad, the narrow lobe not produced much beyond the other.

Mandibles.—The cutting edge divided into nine or ten denticles, on the left mandible the two in the centre projecting beyond the rest; the secondary plate on the left mandible nearly as large as the principal, with a straight row of eight denticles; on the right mandible the secondary plate is very small, its distal margin not clearly observed; the spine-row of about ten not very long spines; the palp broad, the second joint with three or four spines near the apex on the inner side; the third joint much narrower than the second, more than half its length, with two apical spines or setæ exceeding its own length.

First Maxillæ.—So far as observed, the spines of the outer plate were slender, in general structure like those of *Leucothoë tridens*, the second joint of the palp long and broad, with three short spines on the apex, and some rather long cilia on the outer margin.

Second Maxillæ.—The inner plate scarcely broader than the outer, with a few spines on the apex; the outer plate not reaching quite so far as the inner, the narrow apex tipped with three spines, the convex outer margin ciliated.

Maxillipeds.—The inner plates seem to be slender, nearly as long as the second joint of the maxillipeds; this has a very small rudimentary plate, a spine on the outer apex, but none on the margin below; the first joint of the palp is broad, rather longer than the second or third; the first and second joints have three or four spines on the inner margin, the third has a group of three or four near the inner apex, and one on the outer apex; the finger is longer than the third joint, with a short sharp nail, and a ciliated inner margin.

In the *triturating organs* of the stomach the lower margin has six unequal spines.

First Gnathopods.—Side-plates broader below than above, but with the front lower corner little produced. The first joint as long as the hand, reaching much below the side-plate, the hind margin gently convex, with an apical seta, the front margin sinuous, fringed with ten long setæ; the second joint scarcely longer than broad; the third rather longer than the second, more squared than in the preceding species, carrying two setæ at

the apex, one of them very long; the wrist longer than the hand, scarcely bulbous at the base, the heel broadly tapering, curved at the tip, which reaches, or even reaches beyond, the apex of the hand, the hind margin fringed with eleven long setæ, the front or inner margin having only a few hairs; the hand a sort of elongate oval, narrow at the base, with a few spinules on the hinder or inner margin and one at the apex of the outer; the finger very small and short, apparently not adapted for closing down between the hand and the process of the wrist.

Second Gnathopods.—Side-plates with the front margin convex, forming a little tooth below, the lower margin also convex. The branchial vesicles of narrow oval shape, longer than the first joint. The limb shaped nearly as in the preceding species; the first joint with two or three setules near the front apex, and two on the hinder, the margins otherwise smooth; the second joint not longer than broad, with two spinules on the apex of the hind margin; the third joint with five setiform spines along its distal border; the process of the wrist not quite reaching the beginning of the palm, its edges not serrate; the front margin of the hand nearly straight, not apically produced into a point either sharp or blunt, with a group of setæ a little below the apex; the hind margin half as long as the front, the smooth very convex palm margin and the finger being proportionately shorter than in the other species; there are a few spinules on the surface within the palm-margin.

First Peræopods.—Side-plates more or less oblong, with a small tooth at the bottom of the front margin. The branchial vesicles widening below, a little shorter and broader than the first joint. The first joint lageniform, with three or four spinules on the front margin, the hind margin smooth; the third joint carrying a spinule on the decurrent front apex, and another higher up the margin; the fifth joint is longer than the fourth, as long as the third, the hind margin straight, unarmed, except with a couple of setules or hairs; the finger curved, sharply pointed, more than half the length of the fifth joint.

Second Peræopods.—The short front and hind margins of the side-plates diverge, and are connected the one with the other by a very long convex lower margin; the front margin ends in a little notch. The limb does not materially differ from that of the first peræopods.

Third Peræopods.—The side-plates with the front lobe broader and deeper than the hinder one. The first joint oval, with three or four little spines on the front margin, the hinder absolutely smooth; the third joint very decurrent behind, the apex a little rounded, and the convex hind margin having a spinule near the centre. The rest of the limb missing.

Fourth Peræopods.—The hinder lobe of the side-plates deeper and longer than the front one. The first joint of the limb larger and much broader than in the preceding pair, with five spines on the front margin, the hinder perceptibly serrate; the third joint as in the third peræopods, but larger. The remainder of the limb missing.

Fifth Peræopods missing.

Pleopods.—Coupling spines not observed, cleft spine single; joints of the rami numbering about five or six.

Uropods.—The relative dimensions of the first and second pairs much as in the two preceding species. The third pair missing.

The Telson appeared to be rather shorter in proportion to its length than in the preceding species.

Length.—The specimen, in the (curled) position figured, measured, in a straight line from the rostrum to the back of the third pleon-segment, one-tenth of an inch.

Locality.—Station 186, in Flinders Passage; lat. 10° 30′ S., long. 142° 18′ E.; depth, 7 to 8 fathoms; bottom, coral mud. One specimen.

Remarks.—The specific name refers to the place of capture.

Between this species and *Leucothoë brevidigitata*, Miers,[1] the following differences may be noticed. Mr. Miers' specimen, obtained at Thursday Island, was very much larger, "length about 7½ lines (16 millim.)"; the flagellum of the upper antennæ was thirteen or fourteen jointed; the first gnathopods "have their basus joints moderately dilated, with the posterior margins thin-edged and hairy;" the front margin of the wrist is much longer, to judge by the figure, than in the Challenger species; in the second gnathopods the carpus is said to be "very short, and produced along the posterior margin of the propus for less than half its length," while the figure shows the palm of the hand very long and concave instead of convex; nothing is said of the fringe of setæ on the front margin of the first joint and hind margin of the wrist of the first gnathopods, which are very noticeable features in *Leucothoë flindersi*, nor is mention made of the long cylinders on the flagellum of the upper antennæ. Nevertheless the possibility remains that the specimen here described may be only the young form of *Leucothoë brevidigitata*.

Genus *Seba*, Costa.

(?) *Seba*, Costa (?).
1862. „ Spence Bate, Brit. Mus. Catal. Amph. Crust., p. 159.
1875. „ Stebbing, Ann. and Mag. Nat. Hist., ser. 4, vol. xv. p. 2.
1884. *Teraticum*, Chilton, Trans. New Zealand Inst., vol. xvi. p. 257.
1885. *Seba*, Chilton, New Zealand Journ. Sci., vol. ii. p. 320.

The original authority for this genus has thus far eluded my researches. For a definition, apparently translated from a memoir by A. Costa, see Note on Spence Bate, 1862 (p. 334). For a second, independent definition, see Note on Chilton, 1884 (p. 550). The genus makes some approach to *Leucothoë* in the proportions of the mandibular

[1] "Alert" Report, p. 313, pl. xxxiv. fig A, 1884.

palp, the plates of the first maxillæ, the small inner plates of the maxillipeds, but on the other hand the palp of the first maxillæ is one-jointed, and the outer plates of the maxillipeds, though small, are not rudimentary. The telson is undivided as in *Leucothoë*, but the third uropods are uniramous as in the Stenothoinæ. In the gnathopods of *Seba* it is not the wrist, as in *Leucothoë*, but the hand which sends out the chela-forming process. In the British Museum Catalogue, Spence Bate places *Pardaliscu* immediately before *Seba*, and *Leucothoë* before *Pardaliscu*. Thomson and Chilton in their New Zealand Catalogue place *Seba* immediately after *Leucothoë*. Gerstaecker, with a note of interrogation prefixed, makes *Seba* a synonym of *Leucothoë*, but in the definition of the latter genus he describes the wrist of the gnathopods as "stark fingerförmig ausgezogen," both this character and the account given of the uropods precluding the union of the two genera which he suggests. Boeck's definition of the Leucothoinæ would require to be considerably modified for the inclusion of *Seba*, which for the present I am content to place rather on the confines of the family Leucothoidæ (Sars) than within it.

Seba saundersii, Stebbing, 1875 (Pl. XLIX.).

1875. *Seba Saundersii*, Stebbing, Ann. and Mag. Nat. Hist., ser. 4, vol. xv. p. 2, pl. xv. figs. 2, 2*a*–2*c*.
1884. *Teraticum typicum*, Chilton, Trans. New Zealand Inst., vol. xvi. p. 257, pl. xviii. figs. 1, 1*a*–1*f*.
? 1885. *Seba typica*, Chilton, New Zealand Journ. Sci., vol. ii. p. 320.
1886. „ „ Thomson and Chilton, Trans. New Zealand Inst., vol. xviii. p. 148.

The lateral lobes of the head narrow, not very prominent, the first two segments of the pleon postero-laterally almost right-angled, the hind margin of the second segment faintly serrate upwards, the third segment with the postero-lateral angles somewhat produced, rounded.

Eyes not observed.

Upper Antennæ.—The first joint shorter but broader than the second, the third scarcely half the length of the second, the flagellum of five joints, together equal to the second joint of the peduncle, the first equal to the third joint of the peduncle, the first four armed with cylinders; the accessory flagellum not quite so long as the first joint of the primary, its first joint narrow and tapering, its second rudimentary, cylindrical, tipped with two setules.

Lower Antennæ rather shorter than the upper. The first joint a little dilated, the second as long as the third, with the gland-cone inconspicuous; the fourth joint longer than the three preceding joints united; the fifth shorter and narrower than the fourth, tapering slightly; the flagellum of three joints tipped with setules, the first joint longer than the second, and the second than the third, the three together shorter than the fifth joint of the peduncle.

Upper Lip with the distal border slightly emarginate.

Mandibles with the trunk broad, the cutting edge slightly angled and divided into about seven teeth; the secondary plate on the left mandible with six teeth, its breadth almost as great as that of the principal plate; the secondary plate on the right mandible less broad and much less strong than the principal plate, its distal edge minutely denticulate; the spine-row begins with three short spines, of which the first is laminar, with a widened denticulate distal edge, a short ciliated space is followed by a fourth spine pointing backwards and ending in two unequal teeth; of molar tubercle there appears to be no trace; the palp is broad, set well forward, the first joint longer than broad, the second joint broad and long, with a couple of setules near the apex of the inner margin, the third joint much shorter and narrower than the second, apically pointed, with two spines or setæ on the inner side of the apex.

Lower Lip broad, the somewhat narrowed and lightly ciliated apices of the principal lobes standing wide apart, their inner margins sinuous; the mandibular processes short, apically narrowed and rounded.

First Maxillæ.—Inner plates small, oval, with one or two hairs observed on the apex; the outer plates broad at the base, the obliquely truncate distal margin carrying seven spines, the innermost with five lateral teeth, followed by two other slender spines apparently with fewer lateral teeth; in the parallel row the two innermost spines are furcate, the inner branch or tooth being the longer, the other two spines have a single denticle on the inner side; the palp is one-jointed, tapering, reaching beyond the outer plate, having two small spines on the apex.

Second Maxillæ.—The inner plates much shorter and a little broader than the outer, with two spines on the apex; the outer plates with three spines on the apex.

Maxillipeds.—Inner plates small, scarcely reaching the base of the palp, carrying a spine on the upper part of the inner margin, a spine-tooth at the inner apex, with a slender curved spine on the outer curve of the distal margin; the outer plates narrowed, reaching as far as the distal end of the first joint of the palp, with a small not pointed spine near the middle of the inner margin, a spine-tooth in an indent just below the apex, accompanied by a slender spine, and a second spine-tooth at the apex; the first joint of the palp is broad, with one or two spinules on the inner margin; the second joint is rather broader and longer, with eight marginal or sub-marginal spinules; the third joint is shorter and narrower than the first, the outer margin produced into a pointed cap over the base of the finger, the apex and part of the inner surface carrying some finely pectinate spines; the finger is curved, longer than the third joint, with a small dorsal cilium near the hinge, and a cilium at the base of the short sharp nail.

The *triturating organ* of the stomach shows a group of some eight broad spines, distally thorny.

First Gnathopods.—The side-plates broader below than above, the rounded lower

front corner produced to the base of the lower antennæ. The first joint reaching beyond the side-plates, distally widening, the front margin smooth, rather sinuous; the second joint with one pectinate spine low down on the hind margin; the third joint a little longer than the second, narrowed distally, with three pectinate spines on the apical border, the uppermost the longest; the wrist triangular, longer than broad, distally somewhat cup-like, the hind margin near the apex having a fringe of eight graduated spines, the lowest and longest less conspicuously pectinate than the others; the hand much longer than the wrist, the basal part longer than broad, fringed on the hinder side with thirteen finely plumose setæ, and on this side carrying a long thumb, tapering to an abruptly curved tip, which is set about with four short curved spines, against which the equally long and almost similarly formed finger antagonizes, making the hand completely chelate; the thumb and finger are shorter than the basal portion of the hand; the finger has one or two setules or cilia on the outer margin near the base, and the thumb has a series along the margin which adjoins the finger.

Second Gnathopods.—Side-plates with the front margin convex, the width of the plates nearly even throughout. The first joint rather longer than in the preceding pair, not distally widened; the second joint narrow, as long as the wrist, the hind margin almost straight; the third joint a narrow oval, much shorter than the second, like it armed only with a cilium near the apex; the wrist narrowly triangular, longer than that of the first gnathopods, but not so broad distally, with an apical cilium; the hand similar in general structure to that of the first gnathopods, but longer and narrower, the front and hind margins alike unarmed, except for a cilium on the thumb at some distance from the curved apex, and two spines at the apex; the border adjoining the finger is armed as in the preceding pair; the finger, which here as there is narrower than the thumb, has similarly placed cilia. In the Plate the more highly magnified figure of the apex of this limb has been left without the line of dots which should have connected it with the smaller figure.

First Peræopods.—Side-plates squared, with the front and lower margins convex, separated by a notch or tooth, the hind margin sinuous, rather longer than the front. The branchial vesicles narrowly oval, very small, little more than half the length of the first joint. The marsupial plates rather longer than the branchial vesicles, apically fringed with long broad setæ. The first joint reaching beyond the side-plates, with a few spinules at distant intervals on the margins, which are nearly straight; the second joint short, with an apical spinule behind; the third joint with two spinules on the straight hind margin, one on the convex front margin at the centre, and another on its decurrent apex; the fourth joint shorter than the third, with spines at three points of the straight hind margin; the fifth joint longer than the fourth, subequal to the third, with spines at four points of the hind margin; the finger more than half the length of the fifth joint, with a small dorsal cilium near the base, the nail short, sharp, slightly curved.

Second Peræopods.—These, with the side-plates, branchial vesicles, and marsupial plates, closely resemble the preceding pair.

Third Peræopods.—Side-plates broader than deep, the lobes nearly equal. The branchial vesicles and marsupial plates nearly as in the two preceding segments. The first joint of the limb oval, with spines at five points of the flattened front margin, and three or four slight serratures on the hinder one; the second joint short, with two little spines on the front margin; the third joint with spines at three points on the front margin, and three on the very decurrent hind margin, the third being just behind the rather blunt apex; the fourth joint shorter than the fifth, with spines at three points in front; the fifth joint a little shorter than the third, with spines at four points of the straight front margin, and two setules or cilia on the slightly convex hind margin; the finger as in the preceding pair of limbs.

Fourth Peræopods.—These differ very slightly indeed from the third; they are rather larger, and the fourth joint has spines at four points of the front margin.

Fifth Peræopods.—These are very similar to the two preceding pairs, but the first joint is considerably larger, the front margin nearly straight, the hind margin very convex; the remaining joints are not longer than those that correspond in the fourth pair; the fourth joint has spines at three points in front.

Pleopods.—The coupling spines, so far as could be made out, are filiform, with backward serratures at the upper part; there is but one cleft spine; the joints of the inner ramus are four, of the outer five, in number.

Uropods.—The peduncles of the first pair are shorter than those of the second, shorter than the rami, with one or two spinules on the outer, and an apical spinule on the inner, margin; the rami are slender, tapering, without spines, the inner longer than the outer, tipped with a minute nail; the peduncles of the second pair longer than those of the first or third, a little shorter than the rami, which are subequal, curved at the tips, with a small spine at about the centre, the inner ramus a little longer than the outer; the peduncles of the third pair are shorter than the broad, lanceolate, single ramus, which reaches back not quite so far as the rami of the second pair, has strongly pectinate edges, one or two setules on the surface, and a broad apical nail accompanied by a cilium.

The Telson triangular, much longer than broad, the sides slightly convex, the smoothness of each a little interrupted at the point where a submarginal cilium is inserted not far from the rounded point of the apex, the margin here being almost imperceptibly serrate.

Length.—The specimen, in the position figured, measured, in a straight line from the front of the head to the apex of the second uropods, three-twentieths of an inch.

Locality.—Station 313, off Cape Virgins, Patagonia, January 20, 1876; lat. 52° 20′ S., long. 67° 39′ W.; depth, 55 fathoms; bottom, sand; bottom temperature, 47°·8. One specimen, female.

Remarks.—The specific name was given in honour of the late W. Wilson Saunders Esq., F.R.S.

There seems little reason to doubt that this is the same species as that described in the Annals and Magazine of Natural History for March 1875. The specimen originally figured was obtained from a collection of sponges and other marine objects which had been gathered partly in Algoa Bay, South Africa, and partly from the neighbourhood of Swan River, West Australia. As the various objects had been packed together, small specimens might easily have been shaken out of one into another, and therefore the proper habitat to assign to such small specimens would become a matter of uncertainty. *Teraticum typicum*, described by Mr. Charles Chilton in 1884, must, I think, be identical with the present species, and from his figures it may be inferred, as he suggests, that the first gnathopods of the two sexes differ greatly, if we may presume that his figures 1*b*, 1*c* represent the first gnathopod of the male. In his account of the antennæ, Mr. Chilton gives "first joint of upper antenna equal in length to the second, but stouter," whereas in the specimen described in 1875 the second joint is a little the longer, and in the specimen here described decidedly longer.

Family Syrrhoidæ, G. O. Sars, 1882.

In 1870 Boeck established the Syrrhoinæ as seventh subfamily of the Gammaridæ; in 1876 he made it the fourth subfamily of the Leucothoidæ; in 1882 Sars changed the subfamily into a family without alteration except in the form of the name. The genera assigned to the group alike by Boeck and Sars are *Syrrhoë*, Goës, *Tiron*, Lilljeborg, and *Bruzelia*, Boeck. Boeck gives the following definition :—

"*Upper Lip* broad, apically insinuate.

"*Mandibles* very strong, broad; the pair not uniform; the left mandible furnished with an inner accessory process; the palp three-jointed, with the last joint very short.

"*Lower Lip* broad.

"*First Maxillæ* with the inner plate broad, setose; the palp two-jointed, narrow, generally furnished apically with few setæ.

"*Second Maxillæ* with broad plates.

"*Maxillipeds* with the outer plates very large, armed with strong teeth on the inner margin; the inner plates broad, long; the palp broad, short, or more elongate.

"The body more or less sub-depressed; the head large; the side-plates of moderate size.

"The *Eyes* often approximate and coalesced.

"*Upper Antennæ* with an accessory flagellum.

"*First* and *Second Gnathopods* alike in form, thin, narrow; the hand subcheliform.

"Last three pairs of *Peræopods* successively longer; the first joint more or less dilated behind.

"*Uropods* biramous; the first and second pairs with the outer ramus shorter than the inner; the third pair with the two rami of almost the same length, laminar, setose on the margin.

"*Telson* long, cleft." In *Tiron*, however, the hand of the gnathopods is not subcheliform.

Genus *Syrrhoë*, Goës, 1865.

1865. *Syrrhoë*, Goës, Crust. Amph. Maris Spetsb., p. 12.
1870. „ Boeck, Crust. Amph. bor. et arct., p. 67.
1876. „ Boeck, De Skand. og Arkt. Amph., p. 471.

For the brief original definition of the genus, see Note on Goës, 1865 (p. 357). The following more expanded definition was given by Boeck in 1870:—

"*Mandibles* very thick, robust, apically little dentate; molar tubercle prominent, not robust.

"*Eyes* confluent.

"Side-plates of moderate size.

"*First* and *Second Gnathopods* with the hand short, subcheliform; the second gnathopods longer than the first.

"The last three pairs of *Peræopods* elongate, narrow; first joint more or less dilated behind.

"*First* and *Second Uropods* with the outer ramus much shorter than the inner.

"*Third Uropods* with the rami foliaceous, subequal.

"*Telson* cleft."

In the description of the subfamily, Boeck states that the lip is insinuate at the apex, which does not appear to be the case with the Challenger species, *Syrrhoë papyracea*. In the generic definition Boeck speaks of the mandibles as with "tubereulo molari prominenti, non robusto," while in the specific description of *Syrrhoë crenulata*, he says "Tyggeknuden er bred, men kun lidet fremstaaende"; in the Challenger species the molar tubercle is both robust and prominent. Norman in 1869 gives a definition of *Syrrhoë*, including the character, "Gnathopods not subchelate," but this evidently has reference to the species *Syrrhoë hamatipes*, Norman, which, as well on account of the gnathopods as of the short fifth peræopods, ought to be transferred to the genus *Tiron*, Lilljeborg. Gerstaecker in 1886 makes *Syrrhoë* a synonym of *Tiron*, which he says differs from *Urothoë* "durch das nicht in eine Greifhand endigende erste und zweite Beinpaar." Yet in this particular character *Tiron* is as much separated from *Syrrhoë* as it is from *Urothoë*.

Syrrhoë papyracea, n. sp. (Pl. L.).

The Head bent down, with a rounded corner over the first joint of the upper antennæ, forming a depressed rostrum, sharp-edged, and acute at the apex, at right angles with the top of the head; the first five segments of the peræon very short; the first three of the pleon very long, the postero-lateral angles a little produced and very acute in the second and third, not produced in the first; the last segment of the peræon and the first four of the pleon-segment are provided with a sharp dorsal tooth on the hind margin, small in the first of these segments, with about eleven denticles on either side, larger in the next, with thirteen denticles on either side, a little longer still in the next, with as many or more attendant denticles, very small in the two following segments, with a diminished number of denticles; the fourth segment of the pleon is long at the upper part, longer than the two following united. The integument dotted with small round spots in various parts, elsewhere presenting the appearance of finely ribbed silk; the first joints of the last peræopods showing prismatic colours.

No *Eyes* perceived.

Upper Antennæ.—The first joint rather thick, a little bent, twice as long as broad, with several setules on the upper margin and the apex of the lower; the second joint thinner and a little shorter, the third three-quarters the length of the second; fifteen joints of the flagellum remaining, together longer than the peduncle, the first joint much longer than the rest, shorter than the third joint of the peduncle, smooth; the secondary flagellum three-jointed, the first joint longer than the first of the primary, the second nearly as long, reaching to the end of the fourth joint of the primary, the third very small, tipped with long setæ.

Lower Antennæ.—First joint a little expanded, second with a well-developed gland-cone, third not longer than the second; fourth narrow, elongate; fifth as long as the third and fourth united; flagellum of eighteen unequal joints, more or less alternately long and short, with some long setæ at the apices of some, the joints together not so long as the peduncle.

Upper Lip with the distal margin not in the least insinuate, forming a rounded apex to an equilateral triangle, the apical border furred very finely, the hairs as usual on the right and left pointing towards the centre.

Mandibles.—Cutting plate with a long scarcely indented edge ending in two strong teeth below; the secondary plate narrow, cut into four teeth, stronger on the left than on the right mandible; spine-row of six spines, the first three stronger than the others; the molar tubercle strong and prominent, the front edge sinuous, with one or two teeth stronger than the crowd of denticles, the hind margin nearly straight, with a comparatively small seta; the first joint of the palp short, the second very long, narrowing a little distally, fringed with setæ, the third joint short, almost rudimentary, tipped with four or five very long setæ.

Lower Lip.—The principal lobes distally rather narrow, little dehiscent, much ciliated, on the inner margin each carrying two spines, which are short, not tapering, but ending in a small double tip; the inner plates inflated; the mandibular processes divergent, apically rounded and narrow.

First Maxillæ.—The inner plate fringed on the inner side with fifteen plumose setæ, the two at the apex being the shortest; the outer plate having on the truncate distal margin eleven strong spines in two rows of four and seven; in the latter the two innermost are plumose, the next three denticulate with from fourteen to eighteen denticles, the other two with two or three denticles; in the other row the outermost spine is broad, simple, the other three are furcate, with the inner arm of the fork shorter than the outer, these spines as well as some in the other row being finely plumose on the upper part of the outer side; the palp is long and slender, reaching much beyond the outer plate, its first joint a good deal longer than broad, but not nearly half as long as the second, which has on the apex four finely denticulate or serrate spines, followed by six more along the inner margin.

Second Maxillæ.—The plates differing but little from one another in length and breadth, the inner plate having a series of about eighteen long plumose setæ, beginning near the base of the inner margin and passing nearly to the distal outer corner; further from the base begins a series of shorter plumose setæ, which keep to the margin till they approach the apex and become submarginal, the apex itself being fringed with plumose spines not passing down the outer margin; the apex of the outer plate is fringed with long curved spines, showing some plumosity below and pectination above; shorter spines pass a little way down the outer margin.

Maxillipeds.—Inner plates broad, reaching beyond the distal end of the first joint of the palp; nine strong plumose spines pass along the upper part of the inner margin round to the outer corner, the three along the distal margin being much shorter than the others; near to these are two curved more slender spines on the distal margin, which is broad, irregularly sculptured, sloping a little inwards, and armed with two strong tapering spine-teeth; on the outer surface at a little distance from the inner margin there is a row of three spines, as shown in the more highly magnified portion of the figure *mxp*, the uppermost of these spines being broad and curved, the next longer and thinner, and the lowest still longer; the outer plates not reaching the distal end of the second joint of the palp, fringed with a row of some sixteen teeth or spines, eight or nine being regular spine-teeth on the inner margin, the remainder with increased length passing gradually into plumose setæ round the distal margin; there are also several groups of slender spines on the surface within the inner margin; the first joint of the palp short, the second long, fringed with long spines or setæ on the inner margin, the third joint longer than the first, fringed with spines on both margins and round the apex; the finger long and tapering, the dorsal cilium set near the base of the nail, which is as long as or longer

than the proximal part of the finger, and has at its base, on the inner side, two cilia or setules, one nearly as long as the nail, the other half as long as the former.

Triturating Organ.—Twelve or more strong spines are set close together at the bases, the apices being very divergent; these spines are of unusual breadth, narrowing with abruptness apically, denticulate on the inner margin; they are surrounded by a forest of slender spines.

First Gnathopods.—The front margin of the side-plates curved to correspond with the under margin of the head, forming an acute angle with the lower margin, which is produced as far as the base of the lower antennæ; these and the next pair of side-plates, though deeper than broad, have a shallow appearance through being so much bent forwards. The first joint of the limb reaching beyond the side-plate, as long as the wrist and hand united, a little dilated at the upper part behind, at the lower part in front, fringed on both margins with setæ more or less plumose; the second joint short, with an apical group of setæ behind; third joint triangular, with a very short free margin in front, the lower half of the somewhat convex hind margin fringed with plumose setæ, some passing across the acute apex; the wrist long and narrow, more than twice the length of the hand, slightly narrowing distally, with seven setæ along the nearly straight front margin, and an apical group, the hind margin crowded with plumose spines of various lengths, the inner surface carrying some nine spines not far from the hind margin, some of these spines being abruptly narrower in the pectinate distal half; the central part of the distal half of the inner surface and the outer surface near the hinder margin is covered with rows of microscopic spinules, which are continued on the centre of the inner surface of the hand but not reaching the palm; the hand widens a little distally; its front margin has an apical group of long setæ, with a similar group a little higher up, followed by one or two isolated setæ; the hind margin is pectinate almost to the palm, near which it has a group of four spines with long accessory threads, the spines themselves graduated in thickness, the first being scarcely more than a seta; the palm is a little oblique, wavy in outline, fringed with long setæ, at its commencement having two edges, between which rises a monster palmar spine, on the sinuous inner side of which are from six to seven stout outstanding denticles, and a still larger decurrent tooth; the finger is long, reaching beyond the palm, the dorsal cilium near the base of the nail, which is much curved, abruptly narrower, but not much shorter than the proximal part of the finger, and having at its base on the inner side some long cilia or setules; on the inner surface of the hand there are four spines and two long setæ.

Second Gnathopods.—Side-plates very similar to the preceding pair, but wider above and less sharply produced below. Branchial vesicles elongate, oval, longer than the first joint of the limb. Marsupial plates narrower than the branchial vesicles but rather longer, distally narrowed, fringed on both margins with setæ, of which some at least are lightly feathered. The first joint similar to that of the first gnathopods but longer and

narrower, and not bulging near the base; the third joint narrower than in the preceding pair, carrying only four or five setæ; the wrist narrow, elongate, almost as long as the first joint, distally scarcely widened, with five small setæ on the gently curved front margin, and an apical group, the hind margin carrying twelve spaced groups of spines on the outer surface, and a smaller number on the inner surface, besides rows of spinules; the hand, though not half the length of the wrist, is much longer than in the preceding pair, more slender, very little widened distally, in the armature closely agreeing with the other gnathopods, the great palmar spine on one of the hands having seven marginal teeth, on the other only five.

First Peræopods.—The side-plates much broader than deep, the front margin sloping forwards, making an acute angle with the long and nearly straight lower margin; behind the plates are very broadly excavate so as to entirely overlap the following side-plates; the hind margin below the excavation is straight, serrate, making almost a right angle with the lower margin. Marsupial plates long and slender, with very long apical setæ. The limb, like the rest of the peræopods, is long and slender; the first joint reaching much beyond the side-plate, equal in length to the fourth and fifth joints united, the margins carrying some long plumose setæ; the second joint short, the third shorter than the fourth or fifth, scarcely decurrent, with a curved slender spine at the hinder apex and two smaller spines on the hind margin, and two on the front; the fourth joint rather longer than the fifth, with seven spines on the hind margin, of which the apical one is very long and curved; the fifth joint straight, with mixed spines on the hind margin, the apical one close to the finger, strong and long, with serrate edges; at the front apex is a fan of eight or nine curved spines; the finger is slender, more than half the length of the fifth joint, the proximal part not so long as the adjacent apical spine of the fifth joint, with a strong dorsal cilium near the base; the nail almost as long as the proximal part of the finger, with two small cilia at its base on the inner margin.

Second Peræopods.—Side-plates very small, excavate behind, with a short straight margin below the excavation, while the remaining margin, which is perhaps front and lower combined, is convex. The marsupial plates and the limb as in the preceding pair.

Third Peræopods.—First joint of the limb almost circular, with five stout spines on the lower half of the front margin, the hinder margin except at the upper part deeply serrate, the hind margin of the inner surface within the wing is straight and distinct; the second joint short; the third much shorter than the fourth, with four spines on the front margin and an apical group, three on the hind margin and a group on its slightly decurrent apex; the fourth joint has spines at seven points in front and at six behind. The rest of the limb missing.

Fourth Peræopods.—The first joint similar in general character and armature to that of the third peræopods, but much larger, longer than broad, the hind margin more overlapping the second joint; the third and fourth joints also much longer than in the

preceding pair, the third with the same number of spines, the very much longer fourth joint with spines at nine points in front, and seven behind; the fifth joint slender, straight, broken.

Fifth Peræopods.—Side-plates much broader than deep. Branchial vesicles very small, not half the length of the first joint. The first joint as broad as the preceding but much longer, similarly armed, the lower margin produced below the second joint; the third joint longer than in the preceding pair, with spines at five points in front and four behind, besides the apical groups; the fourth joint similar to that of the preceding pair; the rest of the limb missing.

Pleopods.—The coupling spines large, broad at the base, with two or three large lateral hooks and some smaller ones, besides a small apical hook; there is a small interlocking process at the apex of the peduncle on the outer side; the cleft spines are four in number; the joints of the rami numbering from seventeen to nineteen.

Uropods.—The peduncles of the first pair longer than the outer ramus, with five spines on the upper margin; the narrow outer ramus with three spines on the lower part of the upper margin and two at the apex; the inner ramus broken, but evidently longer than the outer; the peduncles of the second pair reaching a little beyond those of the first, and those of the third a little beyond the second, but the rami of both broken.

Telson reaching much beyond the peduncles of the third uropods, cleft rather beyond the centre, much longer than broad, the sides of the cleft curving a very little outward to the sharp forked apices, which have the outer peak shorter than the inner, and a cilium inserted at the fork.

Length.—The specimen, in the position figured, measured, in a straight line from the front of the rostrum to the apex of the telson, almost half an inch.

Locality.—Station 24, off Culebra Island, West Indies, March 25, 1873; lat. 18° 38′ 30″ N., long. 65° 5′ 30″ W.; depth, 390 fathoms; bottom, Pteropod ooze; surface temperature, 76°. One specimen, female. Dredged.

Remarks.—The specific name refers to the thin paper-like consistence of the integument.

Syrrhoë semiserrata, n. sp. (Pl. LI.).

Rostrum depressed, acute, carinate; first six segments of the peræon short, first three of the pleon long, postero-lateral angles of the first rounded, of the second produced to a sharp point, in the third the hind margin makes an obtuse angle with the lower, and its lower part is cut into eight slightly upturned denticles; dorsally this segment rather shows a tendency to form a tooth than forms one; the fourth segment is longer than the two following united. Besides the ribbed appearance of the integument, this species

has rounded spots of a darker colour than the rest of the surface, numerous on the lower part of the first three pleon-segments, the third side-plates of the peræon and the first joints of the last three peræopods, but scattered also elsewhere.

Eyes meeting at the top of the head, roundish oval, the ocelli numerous.

Upper Antennæ.—First joint thick, bent, longer than broad, longer than the next two united; second much thinner than the first, nearly twice as long as the third; only nine joints of the flagellum remaining, the first much broader than the rest, narrowing distally, as long as the six following together, fringed with about four and twenty cross rows of broad filaments; the remaining joints carrying small filaments and setæ at different points of the margin; the slender secondary flagellum almost hidden in the bushy fringe of the first joint of the primary, serrate-edged, its first joint much longer than the second, fringed on the one side with setæ, on the other with spines, the narrower second joint reaching the end of the first joint of the primary; a small third joint is broken.

Lower Antennæ.—First joint a little expanded, second very short, third rather longer, bent, fourth twice as long as the third, closely fringed above with setæ; fifth considerably more than twice as long as the fourth, thicker near the base than distally, fringed like the fourth joint; twenty slender joints of the flagellum remaining, fringed with setules.

Upper Lip with the distal margin slightly convex, not incised.

Mandibles.—The cutting edge as in *Syrrhoë papyracea;* the secondary plate of the left mandible with six teeth; the spine-row showing three curved denticulate spines; the molar tubercle prominent, wedge-like, strongly denticulate, with a small seta at the back; the first joint of the palp short, bent forwards; the second joint very long, with the hind margin concave, the front margin convex, carrying six pairs of spines; the very small third joint carrying six very long spines; the muscles of the second joint appear to run right through from the lower outer corner to the apical inner corner. The cutting edge of the right mandible is figured in the Plate, not in profile, but flat, from the outside, with the secondary plate showing through, and not very clearly discerned.

Lower Lip as in *Syrrhoë papyracea.*

First Maxillæ.—Inner plate fringed with about twelve plumose setæ; on the outer plate the two innermost spines are long, slender, finely pectinate on the outer convex edge, the three following are denticulate with from six to eight denticles, the three furcate spines alongside of them have one arm of the fork much shorter than the other, the remaining three are as in the preceding species; the second joint of the palp is twice as long as the first, and has three curved pectinate spines set round the apex and six similarly ornamented setæ on the inner margin.

Second Maxillæ appearing to be very similar to those of *Syrrhoë papyracea*, the inner plate, however, broader than the outer.

Maxillipeds compact, differing but little in general structure from those of the preceding species; the outer plate with six strong and long spine-teeth on the inner margin, followed by four longer on the indented apical margin, and one on the outer margin, rather shorter and more slender than those on the apex, but still more of a spine than a seta.

First Gnathopods.—Side-plates small and slender, directed forwards but not reaching the base of the upper antennæ, the front margin little curved, its lower corner rounded and but slightly produced. The first joint not as long as the wrist and hand united, a little widened distally, the front margin a little concave, with a few setules, the hind margin convex or a little sinuous, with some long setæ; the second joint longer than broad; the third joint short, with the hind margin convex, furred below and carrying three setæ and a row of fine graduated geniculate spines, that nearest the apex the longest; the wrist nearly twice as long as the hand, narrow at both ends, widest near the base, the front margin carrying a few setules, the hind margin fringed with numerous spines of various lengths and some long setæ, many of the spines abruptly narrowing at about the middle and having the distal part pectinate; on the surface of this joint and of the hand there are numbers of adpressed cilia; the hand is narrow, widening a little distally, more than twice as long as broad, with groups of long setæ at and near the apex of the front margin; the straight hind margin fringed with a row of short spines, and having a group of setæ at the apex; the palm is short, at right angles to the hind margin, of irregular outline, fringed with long setæ and defined by a great palmar spine, which on its inner margin has a prominent tooth at right angles, followed by some six slender denticles more oblique, and a rather stouter one that is decurrent; the short sturdy finger reaches beyond the palm-margin with its much curved nail, which equals or exceeds the proximal part of the finger; the dorsal cilium is close to the base of the nail, which has one or two cilia or setules at its base on the inner margin. As in the previous species the palmar spine is of such a character, that were it a process of the hand instead of inserted in it, the limb might be considered chelate rather than subchelate.

Second Gnathopods.—Side-plates not unlike the first pair, also directed forwards, the front margin nearly straight, considerably longer than the hinder margin. Branchial vesicles elongate oval. First joint thinner than in the first pair, but of about the same length, equal in length to the wrist; the second joint much longer than broad, longer than the third joint, channelled in front; the third joint shaped as in the first pair, but armed only with a seta and a setule near the apex; the wrist long and narrow, slightly bent, with some setules on the front margin and a group of setæ at its apex, the hinder margin having some long spines and setæ near the apex; the hand long and narrow, scarcely widened distally, about half as long as the wrist, with a large group of long setæ at, and another close to, the apex of the front margin; the hind margin

pectinate, the upper half fringed with small spines; the palm and finger as in the first pair, but smaller, the palmar spine not having the tooth at right angles to its inner margin.

First Peræopods.—The side-plates narrow above, the oblique front margin forming an acute angle with the long almost straight lower margin, the plate deeply excavate behind, so as to receive in the hollow nearly the whole of the following side-plate. The branchial vesicles like the preceding pair or rather longer, much longer than the first joint of the limb. The first joint slender, reaching much beyond the side-plate, with spinules or setules along the front margin, and a long feathered spine at the hinder apex; the second joint short, with a very small distal lobe in front, such as there is also on the first joint; the third joint shorter than the fourth, with three very slender geniculate spines standing out from the hind margin, the lowest much the longest; the fourth joint about as long as the fifth, narrowing distally, with slender spines at two or three points of the front margin, and five or six of the hinder, the lowest here being of great length; the fifth joint with very slender spines at three points of the front margin, and spines at ten points of the hind margin, the lowest much stronger than the rest and apically hooked; the finger with a small dorsal cilium near the base, a short nail, and a small decurrent tooth-spine at the base of it on the inner margin.

Second Peræopods.—Side-plates small, excavate behind, the hind margin below the excavation straight, the continuous curve of the front and lower margins scarcely extending beyond the preceding side-plate. The branchial vesicles like the preceding pair. The limb very little different from that of the preceding pair, with two or three long slender spines on the margins of the first joint, perhaps only accidentally missing in the first peræopods; the fourth joint with spines of various sizes at eight points of the hind margin, the front margin of this and the following joint pectinately furred.

Third Peræopods.—Side-plates very much broader than deep, bilobed. The branchial vesicles as in the preceding pairs, but smaller. The first joint longer than broad, the front margin descending lower than the hinder, which rises higher than the front, the lower part of the front margin carrying five short stout spines, the central part of the hind margin having five rather deep incisions, each with the usual cilium; the second joint is very short, with one spine at the front apex; the third joint is much shorter than the fourth, with nine long plumose setæ on the hind margin, and at its slightly decurrent apex a short spine and a long one with a very long accessory thread; it has short spines at six points in front; the fourth joint is long, the margins serrate, the front with spines at nine points, the hinder with eleven plumose setæ interspersed with long spines at five points, the spines stiff at first, but where the accessory thread arises becoming setæ-like and very finely pectinate; the fifth joint a little shorter than the fourth, spined at seven points in front and nine behind; the finger slender, a little

curved, scarce half the length of the fifth joint, having a short nail, with a spinule on the inner margin at its base, and another at some distance from the base.

Fourth Peræopods.—Side-plates shallow, oblong behind. The limb similar to that of the preceding pair, but longer. The first joint nearly as broad as long, with six spines on the front margin, and six deep slits and one shallow one on the hind margin; the third joint with fourteen setæ on the hind margin; the finger much less than half the length of the fifth joint.

Fifth Peræopods.—Side-plates shallow, not lobed. The first joint not large, but larger than that of the preceding pair, longer than broad, produced behind beyond the short second joint; the third, fourth, and fifth joints longer than those which correspond in the preceding pair; the finger a third the length of the fifth joint.

Pleopods.—Coupling spines rather long and slender, with a row of three or four lateral teeth; below the coupling spines there are some acute spines; the cleft spines are four in number on the comparatively very short first joint of the inner ramus; the joints of the rami vary in number on the different pairs from fifteen to eighteen.

Uropods.—Peduncles of the first pair longer than the rami; the outer ramus much shorter than the inner, with two or three spines on the margin and two at the apex, the inner ramus shorter than the outer of the second pair, spined along the margins and at the apex; peduncles of the second pair reaching beyond those of the first, much shorter than the inner ramus; the outer ramus spined along both margins and at the apex, much shorter and more slender than the broad and long inner ramus, which reaches even beyond the rami of the third pair, is spined along both margins, and apically pointed; the rami of the third pair are long, lanceolate, the outer rather shorter than the inner, with spines on the margins, a nail at the apex, and long densely plumose setæ on the inner margin; the inner ramus likewise fringed with marginal spines and plumose setæ on the inner margin.

The Telson reaching beyond the peduncles of the third uropods, much longer than broad, cleft much beyond the middle, the apices probably acute, but in our specimen broken, hence in the figure appearing truncate.

Length.—The specimen, in the position figured, measured, in a straight line from the rostrum to the apices of the third uropods, three-tenths of an inch.

Locality.—Station 161, off Melbourne, April 1, 1874; lat. 38° 22′ 30″ S., long. 144° 36′ 30″ E.; depth, 33 fathoms; bottom, sand. One specimen, male. Trawled.

Remark.—The specific name refers to the partial serration of the hind margin of the third pleon-segment, which among other things distinguishes this species from *Syrrhoë crenulata*, Goës.

Family Synopidæ, Bovallius, 1886.

In Dana's classification, 1852, the Synopinæ are the third subfamily of the Hyperidæ; Spence Bate, in 1862, made the Synopiades the first subfamily of the Oxycephalidæ; Kossmann, in 1880, places the family Synopiadæ in the tribe Hyperina; Bovallius, in 1886, named the family Synopidæ, with the following diagnosis :—

"The *head* is triangular, not tumid.

"The *eyes* occupy the upper median part of the head, and are distinctly faceted.

"The *mandibles* are well-developed, with a three-jointed palp.

"The *maxillipeds*, coalesced at the base, carry strong four-jointed palps.

"The *antennæ* are fixed on the under side of the head. The second pair are like those of the Gammarids.

"The *seventh pair* of *pereiopoda* are not transformed.

"The *uropoda* are like those of the Gammarids.

"The *telson* is cleft to the middle."

According to Bovallius the Synopidæ are the first family of a new tribe which he names Amphipoda Synopidea, and in which he places two other families, named respectively, Trischizostomatidæ, Sars, and Hyperiopsidæ. In my opinion the resemblance of *Trischizostoma* (or rather *Guerinia*) to such genera of the Lysianassidæ as *Acidostoma* and *Acontiostoma* is far too close to permit of its separation from the Amphipoda Gammarina (Gammaridea, Bovallius). I have already (p. 576) expressed a similar opinion with regard to the Synopidæ, and think that Claus was quite right when, in 1871, he incidentally remarked that the genus *Synopia* belonged to the Gammarids. If the tribe Synopidea be set aside, much of the diagnosis above given becomes superfluous, since what is said of the maxillipeds, the second pair of antennæ, the seventh (our *fifth*) pair of peræopods, and the uropods, does not require mention for an accepted family of the Amphipoda Gammarina. On the other hand, the remnant of the diagnosis would not suffice to distinguish this family from the nearly related Syrrhoidæ and Pontoporeiidæ; I propose therefore to add the following characters :—

Upper Lip apically bilobed.

Mandibles with the second joint of the palp broad, the third minute.

First Maxillæ with the inner plate small.

Second Gnathopods not subchelate.

First and *Second Peræopods* with the third and fourth joints dilated.

Whether the eyes are in reality faceted I am unable to say.

Genus *Synopia*, Dana, 1852.

1852. *Synopia*, Dana, Amer. Journ. Science and Art, ser. 2, vol. xiv.
1852. ,, Dana, U. S. Explor. Exped., vol. xiii. pt. 2, pp. 981, 994.
1862. ,, Spence Bate, Brit. Mus. Catal. Amph. Crust., p. 341.
1880. ,, Kossman, Zool. Ergeb. Küst. des rothen Meeres, p. 137.
1886. ,, Bovallius, Amph. Synopidea, p. 4.

For the original definition of the genus, see Notes on Dana, 1852 (pp. 259 and 268). Bovallius defines the genus thus :—

"The *body* is compressed.

"The *head* is narrow, triangular.

"The *eyes* are very large, coalesced into one in the middle of the head, with distinct large ocelli.

"The first pair of *antennæ* with a multiarticulate flagellum ; the first joint of the flagellum very long, beset with long hairs.

"The first four pairs of *perciopoda* [first and second gnathopods and first and second peræopods] are unequal, setose, the three last ones subequal, elongate, with long dactyli.

"The last pair of *uropoda* with the outer rami biarticulate.

"The *telson* is very large."

The size of the telson, however, seems scarcely suited for a generic character, since in *Synopia schéeleana*, Bovallius, the telson is of no great comparative size, and in *Synopia gracilis*, Dana, Bovallius himself describes the telson as "obsolete."

Synopia schéeleana, Bovallius, 1886 (Pl. LII.).

1886. *Synopia Schéeleana*, Bovallius, Amphipoda Synopidea, p. 16, pl. ii. figs. 22–29.

Head as long as the first three segments of the peræon, rostrum or front of the head bent down at a right angle to the dorsal line, both this front and the whole dorsal line of the animal being sharp-edged ; the segments of the peræon short, the first three of the pleon long and large, the fourth as long as the fifth and sixth united ; the first three segments of the pleon postero-laterally angled, but not sharply.

Eyes large, oval, meeting at the top of the head, set diagonally across the top front corner of the head. The colour dark in the preserved specimens. Underneath the large eyes, in more or less close proximity, but externally quite distinct, there are two small ones of a few (seemingly four) ocelli.

Upper Antennæ.—First joint bulbous, as broad as long ; second much shorter and narrower than the first, and the third than the second ; flagellum with ten joints

remaining, the first longer than the first of the peduncle or the three following of the flagellum, rapidly tapering, fringed with a brush of long filaments; the next joint short and narrow, with a little apical spine and some marginal setules, the other joints longer, not much thinner, similarly furnished. The secondary flagellum narrow, about as long as the first joint of the primary, two-jointed, the terminal joint minute, missing in the present specimen.

Lower Antennæ.—First joint little expanded, gland-cone very small, third joint longer than broad, apically pointed, fourth joint considerably longer than fifth, broader at the base than distally; fifth joint longer than the third, narrowest at the base; flagellum with fourteen slender joints remaining, at the base abruptly narrower than the peduncle.

Upper Lip unsymmetrically bilobed, both lobes ciliated, the smaller also very finely denticulate, and carrying some minute spine-teeth.

Mandibles.—The cutting plate not very broad, with four or five teeth; the secondary plate on the left mandible with four teeth, that on the right mandible more slender, with two slender distal teeth and possibly some unobserved denticles; the spine-row of six curved denticulate spines; the molar tubercle tolerably massive, with a strong tuft of cilia at the front corner of its multidentate crown, and a small seta behind; the palp shorter than the body of the mandible, the first joint very small, the second abruptly broader, nearly three times as long as broad, with two long plumose setæ on the inner margin; the third joint minute, but tipped with two plumose setæ, still longer than those on the second joint. In the Plate the mandibles are figured from the outer side, so that the right mandible is on the left, the left on the right, of the Plate.

Lower Lip.—The principal lobes closely ciliated on the distal and inner margins; the mandibular processes short and narrow.

First Maxillæ.—The inner plate with five long plumose setæ on the inner margin and two short setæ at the apex; the outer plate appears to have eight small spines on the truncate distal margin, of which the outermost is denticulate, three are distally furcate, and the rest smooth; the second joint of the palp is strongly ciliated on the outer margin, and has five spine-teeth on its distal border, the outermost being longer than the rest, and pectinate.

Second Maxillæ.—The inner plate with a row along the inner margin of about eighteen long setæ slightly widened near the base; the apical border of each plate furnished with several plumose seta-like spines.

Maxillipeds.—The inner plates short, not reaching the distal end of the first joint of the palp, with about ten ciliated spines or setæ on the sloping distal margin and upper part of the inner edge, which below is strongly ciliated; the outer plate narrow, not quite reaching the apex of the second joint of the palp, strongly ciliated on the outer margin, which has at the top two long plumose setæ; there is also a long row of plumose setæ

down the inner margin; the first joint of the palp is short, the second very long, fringed on the inner margin with long plumose setæ, which, like those of the outer plate, might equally well be designated as spines; the third joint a little bent, with two plumose setæ on the convex outer margin, and three on the truncate distal border; the finger very small, the long spine-like nail being about twice as long as the base.

The *triturating organs* appear to have very many slender spines, but not stout strong ones.

First Gnathopods.—Outline of side-plates not clearly made out. First joint reaching much beyond the side-plate, as long as the wrist, widening distally, near the front apex having two long plumose setæ; the second joint with a plumose seta on the hinder apex; the third joint with the hind margin almost semicircular, carrying a setule at the centre, two plumose setæ near the apex; the wrist a very elongate oval, narrow at both ends, much longer than the hand, the front margin convex, unarmed, except that at the apex there are two geniculate spines which have their lower half pectinate; the hind margin more convex, fringed with eighteen long plumose setæ, near which there are five or six smaller setæ on the surface; the hand narrow at the base, thence rapidly widening, tending to oval, the front margin with two apical spines, one apparently smooth, the other feathered with six or seven long branches; the convex hind margin carries nineteen long plumose spines or setæ, and close to the finger a geniculate spine much longer than the rest, and much longer than the finger; the surface has many adpressed cilia near the front, and five plumose spines near the hind margin; the finger is nearly as long as the hand, slender, slightly geniculate, the tip curved.

Second Gnathopods.—Side-plates doubtful, seemingly with the front and lower margin forming a continuous convex curve. Branchial vesicles longer than the first joint of the limb. In a female specimen the marsupial plates were very narrow, but nearly as long as the branchial vesicles, and having long setæ. The first joint of the limb slenderer than in the preceding pair, about as long as the wrist, but narrower; the second and third joints small as in the preceding pair, the third with two setules but seemingly without long apical setæ; the wrist elongate, as long as in the preceding pair, but much narrower, narrowest distally, the hind margin carrying about fourteen pairs of long setæ, strongly rather than densely plumose, most of them geniculate, and on a blunt apex having a little point with two long arms, diverging one on either side; the hand longer and narrower than in the preceding pair, about three-quarters the length of the wrist, narrow at both ends, with seven of the furcate and six of the unfurcate setæ along the hinder margin, the apex having two of much greater length than the rest, longer than the hand itself; between the two latter is the minute finger, of which the basal portion has a tooth on the inner margin, and the nail, which is equally long but abruptly narrower, has one on the outer.

First Peræopods.—Side-plates larger than the preceding pair, front margin similar,

the hind margin sloping irregularly backwards, to form an acute angle with the convex lower margin. The branchial vesicles narrow above and below, longer than the first joint of the limb, the distal end bending a little forwards. The first joint reaching beyond the side-plate, wider below than above, with three spines on each margin; the second joint with one spine at the hinder apex; third joint about as long as the wrist, and broader, the front margin ciliated, with a long spine at the apex, the hind margin very convex, with three spines on the lower part; the wrist oval, the distal end narrow, the hind margin a little crenate, with nine long plumose spines or setæ; the hand narrow, as long as the wrist, with six slender plumose setæ on the hind margin; the finger straight, not tapering, with a little curved nail, the two together not so long as the adjacent spines, which indeed exceed the length of the hand.

Second Peræopods.—Side-plates not clearly made out, but apparently much smaller than the preceding pair. Branchial vesicles like the preceding pair. First joint of the limb narrow above, much dilated below, lageniform, with a long apical spine or seta on the hind margin, and a spine above the apex on the front margin; the second joint short, with an apical seta behind; the third joint more triangular than in the first peræopods, similarly armed, not nearly so long as the wrist; the wrist long, oval, much larger than in the first peræopods, attached to the third joint by the top of the smooth front margin, the hind margin from apex to apex set round with twenty-two long plumose setæ, those below being the longest; the hand very much smaller than the wrist, a narrow oval, rather wider at the truncate distal end than at the base, with an apical seta in front, and eight very long ones on the serrate hinder margin; the finger is small, straight, with a little decurrent tooth or spinule on the inner margin at the base of the short curved nail.

Third Peræopods.—The side-plates appear to be small, but the extreme delicacy and transparency of these and the other side-plates make it extremely difficult to ascertain their precise boundaries, and in Dana's figures of this genus they are almost concealed under a blotch of colour.[1] The branchial vesicles reach below the second joint of the limb. The first joint is oval, the front longer than the hinder margin, with three setiform spines at intervals and a small apical spine, the hind margin of great tenuity; the

[1] By Bovallius, Amphipoda Synopidea, pp. 9, 10, a clear account is given of the side-plates of *Synopia ultramarina*, Dana, as follows:—"The epimerals of the first and second segments are as long as the segments, of an irregular shape and only half as deep as long. The epimerals of the third segment (Pl. I. fig. 13) are enormously developed. They are quadrangular, with the upper corner (the articulation with the segment) truncate, and the hinder margin excavate. At the inside of the upper corner is a tuberculous prominence, against which the upper end of the femur articulates; the epimeral is as deep as the length of the femur of the corresponding leg, quite as large as the femur of the fifth pair. The epimerals of the fourth segment are scarcely as long as the segment (Pl. I. fig. 14), deeper than long, the anterior margin rounded, the posterior straight; at the middle of the upper margin there is on the inside of the epimeral a tubercular projection for the articulation with the leg. The epimeral reaches as far down as half the length of its femur, and is partly concealed by the femur of the fifth pair of pereiopoda. The epimerals of the fifth and sixth segments are longer than the segments, rounded at both ends, more than twice longer than deep; the posterior portion is a little deeper than the anterior. The last epimerals are shorter than the segment and smaller than the preceding, but of the same form (Pl. I. fig. 17)." Of *Synopia schéeleana*, he says, "The *epimerals* (Pl. II. fig. 22) resemble very closely those of S. ultramarina."

second joint short; the third longer than the fourth, shorter than the fifth, with apical spines before and behind, and three small spines along the front margin; the fourth joint with apical spines in like manner, and two groups on the front margin; the fifth joint with spines at six points in front and three behind, one of those at the front apex being much longer than the rest; the finger almost straight, about half the length of the fifth joint, pectinate.

Fourth Peræopods.—The side-plates with the lower hinder corner apparently angled. The branchial vesicles and limb almost as in the previous pair, but all the joints larger, the first with one seta instead of three on the front margin, the third with only one small spine high up on the front, and one low down on the hind margin, besides the apical spines; the fourth joint with an extra spine on the hind margin; the fifth with spines at eight points in front and five behind; the front margins of the lower joints more conspicuously pectinate than in the preceding pair.

Fifth Peræopods.—Branchial vesicles nearly as large as the first joint. The first joint not oval, the front and hind margins nearly straight except at the top, unarmed, the hinder produced so as to form an acute angle with the lower margin much below the short second joint; the third joint not quite so long as the first or fifth, longer than the fourth, with spines at three points in front, and the apex behind; the fourth joint with spines at four points in front and two behind; the fifth with spines at seven points in front and five behind; the finger rather shorter than in the preceding pair.

Pleopods.—The peduncles of great breadth, the hinder apex rounded; the coupling spines broad for the basal two-thirds, then narrow, with two lateral teeth projecting, not retroverted; the cleft spines two in number, the outer arm not much longer than the inner, conspicuously pectinate; the joints of the rami twelve to thirteen.

Uropods.—Peduncles of the first pair subequal to the inner ramus, with four spines on the upper margin; the outer ramus shorter than the inner, with one of its upper edges finely pectinate, the other pectinate with small spines, the apex having three spines, of which the largest has the appearance of being jointed in the middle; the inner ramus is similarly furnished, but has also a spine at the middle of the finely pectinate margin; peduncles of the second pair scarcely so long as the inner ramus, not nearly reaching so far back as the peduncles of the third pair, carrying three spines on the upper margin; the outer ramus shorter than the inner, pectinate with spines along the upper margin, and tipped with a spine of jointed appearance, the inner ramus armed in like manner, with the addition of a prominent spine on the proximal part of the upper margin; the peduncles of the third pair very much shorter than the rami, which are long, broad, lanceolate, subequal, fringed on the inner margin with long plumose setæ, the outer with a spine on the outer margin not far from the apex.

Telson short, oval, reaching a little beyond the peduncles of the third uropods, cleft beyond the centre, each apex forming a double point, the outer advanced beyond the inner, the cavity containing a small spine.

Length.—The specimen, in the position figured, measured, in a straight line from the front of the head to the apex of the third uropods, one-fifth of an inch.

Locality.—The specimen figured was taken in the Pacific, at the surface, September 1875. The figure of the fifth peræopods, with the adjacent ventral portion of their segment, will show that this specimen was a male. A female of the same species was taken at St. Vincent, Cape Verde, April 26, 1876. A third specimen, small and in poor condition, was taken at the surface, lat. 24° 49′ N., long. 138° 34′ E. A fourth specimen was taken in "W. Pacific, 16 Febr. 75."

Remarks.—That the species belongs to Dana's genus there can be no doubt, although he speaks of a single large compound eye, whereas to the present species one might be justified in attributing two pairs of eyes.

From Dana's *Synopia ultramarina* the present species differs in having the second joint of the mandibular palp much longer; the finger of the first gnathopods in Dana's species "applies against the rounded terminal margin" of the hand, which it scarcely seems adapted for doing in our species; of the first peræopods Dana says that "the finger is slender, with a short claw, the whole about as long as the hand," but in our species the proportions of the joints referred to are different, the hand and finger together being considerably longer than the wrist. He says, moreover, that the branchiæ in his species are oblong, sublinear, except those of the fifth peræopods. Here the epithet sublinear would not apply. It is nevertheless still possible that both this and Dana's own *Synopia angustifrons* may be synonyms of his *Synopia ultramarina*, the resemblances between the three having a tendency to outweigh the differences.

The figures and description given by Bovallius of his new species so closely agree with those prepared for the Challenger specimens, that I have little hesitation in accepting his specific name, to supersede that which I had myself chosen. But here also there are some slight points of difference: Bovallius figures a lageniform eye; he states that in the second pair of uropods the outer ramus is totally smooth along both margins, and he describes the telson as "bifid with rounded ends, the fissure scarcely equalling half the length of the telson," without either mentioning or figuring the small apical cavity in each half of the telson. He gives the colour of his specimens as hyaline, the length 4 to 6 mm., the habitat "the tropical parts of the Atlantic" and "some twenty miles east off Barbadoes."

Family Pontoporeiidæ, G. O. Sars, 1882.

Dana in 1852 established the Pontoporeinæ as fifth subfamily of the Gammaridæ. He placed it under the heading, "Pedes 10 postici partim prehensiles," with the vague and insufficient definition, "Pedes 3tii 4tique plus minusve prehensiles; 6 postici non

prehensiles." To it he assigns the genera *Lepidactylis*, "*Pontiporeia*," *Ampelisca*, *Protomedeia*, *Aora*, in one division, and *Phoxus* by itself in a second. In 1857[1] Spence Bate made the Pontoporeidæ the fourth subfamily of the Gammaridæ, with the genera *Westwoodia*, *Kröyera*, *Phoxus*, *Sulcator*. In the same year he changed the name of the subfamily to Phoxides, on the ground that Kroyer's *Pontoporeia* belonged to the Lysianassides. In 1862 he placed in the subfamily Phoxides the genera *Phoxus*, *Grayia*, *Westwoodilla*, *Œdicerus*, *Monoculodes*, *Kröyera*, *Amphilochus*, *Darwinia*, *Lafystius*, *Guerinia*, *Lepidactylis*, *Sulcator*, *Urothoë*, *Liljeborgia*, *Phædra*, *Prosoponiscus*, *Isæa*, *Iphimedia*, *Otus*, *Acanthonotus*. Lilljeborg in 1865 made the "Pontoporeina, Dana," the second subfamily of the Gammaridæ, with the genera *Bathyporeia*, *Stegocephalus*, *Pontoporeia*, and the "Phoxina (Phoxides, S. Bate)" the fourth subfamily, with the genera *Phoxus*, *Urothoë*, *Tiron*, by implication therefore including *Syrrhoë* also. Boeck in 1870 made the "Pontoporinæ, Dana," the second, and the "Phoxinæ, Spence Bate," the fifth subfamily of the Gammaridæ. In 1872–6 he placed the two subfamilies side by side, as respectively the second and third subfamilies of the Gammaridæ, the Pontoporinæ receiving the genera *Pontoporeia*, *Priscilla*, *Argissa* and *Bathyporeia*, the Phoxinæ containing the genera *Phoxus*, *Harpinia*, *Sulcator*, *Urothoë*. Gerstæcker in 1866 places *Stegocephalus*, *Pontoporeia*, and *Bathyporeia* in the second division of the "*Lysianassina* (*et Stegocephalina*), Dana," sinking the names *Andania*, *Priscilla*, and *Argissa* as synonyms, while to the "*Phoxina* Sp. Bate," he gives much the same extension as Spence Bate gives to the Phoxides. Sars in 1882 established, without defining, the Pontoporeiidæ, as fourth family of the Gammarina, placing in it the eight genera which Boeck had divided between the Pontoporinæ and Phoxinæ. From the definitions given by Boeck of the two groups, the following characteristics may be taken as belonging to both:—

Upper Lip apically rounded.

Mandibles apically dentate, strong, with a powerful molar tubercle, palp triarticulate.

Upper Antennæ short, with an accessory flagellum.

Third, *Fourth*, and *Fifth Peræopods* of various forms in the different genera, especially the third pair; the fourth pair generally longer than the third or fifth, sometimes much dilated; the fifth pair with the first joint much dilated.

The *Uropods* biramous.

Telson more or less cleft.

The first four pairs of side-plates generally large, plumose on the lower margins.

In 1885 Sars makes the Phoxidæ the second family of the tribe Gammarina, placing in it the genera *Phoxus*, *Harpinia* and *Urothoë*, but without otherwise indicating the limits of the family.

[1] See also Note on Spence Bate, 1856 (p. 290).

Genus *Cardenio*, n. gen.

Upper Antennæ shorter than the lower; the first joint not apically clubbed, the third joint not shorter than the second of the peduncle or the first of the flagellum.

Third joint of the mandibular palp short, but not rudimentary.

Maxillipeds.—The fourth joint absent or rudimentary.

The finger rudimentary in the first gnathopods, absent from the second gnathopods, the first, second, and fifth peræopods, short and blunt in the third and fourth peræopods.

Telson long, deeply cleft.

The generic name is taken from a character in Don Quixote.

The genus is allied to *Bathyporeia*, Lindström, by the character of the limbs, the gnathopods also showing a resemblance to those of *Synopia*, Dana.

Cardenio paurodactylus, n. sp. (Pl. LIII.).

The head projecting over the antennæ in what from above or from the side appears to be a rounded point, but in front appears to be truncate; the head dorsally as long as the first two segments of the peræon; the back rounded, widening to the centre of the peræon, and then narrowing; the hind rim of the pleon-segments more or less crenate or dentate across the centre of the back; the postero-lateral angles of the first two rounded, of the third acute; the fourth, fifth, and sixth segments not very short.

Eyes small, reniform, set near the front of the head, near together, forming an angle one with the other, dark in the spirit-specimen, with the ocelli numerous, more than sixty in number.

Upper Antennæ.—Peduncle of three short joints, the first a little longer than the third, both than the second, which is intermediate in thickness; flagellum four-jointed, equal in length to the second and third joints of the peduncle, with a pair of stout cylinders on each of the first and second joints; the secondary flagellum with one long joint and a minute second one, the two together not equalling the first of the primary, which itself is longer than the second of the primary, but shorter than any of the joints of the peduncle. In one specimen the accessory flagellum had an additional joint.

Lower Antennæ.—First and second joints short and small, gland-cone not produced; third joint as long as the two preceding combined, fourth joint stouter but a little shorter than the fifth; third, fourth, and fifth armed to some extent with spines; flagellum slender, five-jointed, the first joint the longest. In one specimen the flagellum was seven-jointed.

Upper Lip.—Both plates broad and thin, squarely rounded distally, the outer advanced a good deal beyond the inner, its distal margin smooth in the centre, with a group of cilia on either side.

Mandibles short and strong; cutting edge divided into four teeth; secondary plate on the left mandible with a strong upper tooth and three smaller below it, on the right mandible bidentate, but with denticles on the larger teeth; the plan of these plates is best seen in the unworn condition as it appears through the transparent integument in preparation for the next change of skin; the spine-row exhibits three curved serrate spines on the left mandible, on the right only two, but one of these two laminar; the molar tubercle very large and prominent, with strongly dentate crown; the palp set rather behind the very forward molar tubercle, its first joint very short, the second longer than the first and third united, with spines on the surface near to both margins; the short third joint, widest about the centre, has spines on the inner side of the upper half, the longest at the rounded apex.

Lower Lip short and broad, inner lobes stout.

First Maxillæ.—Inner plate broadest at the base, with twelve plumose setæ round the inner margin and apex; outer plate broadest at the base, carrying on the truncate apical margin nine finely denticulate or pectinate spines; the long second joint of the palp overarching the outer plate, and on its apical margin carrying six slender spine-teeth, and seven small setæ below the apex.

Second Maxillæ.—Both plates broad, with long slender spines on the broad apical margins; the inner plate also with a row of setæ passing from the inner margin across towards the outer apex, and with two spines or setæ on the inner margin just below the apex.

Maxillipeds.—Inner plates rather small, but extending considerably beyond the very short first joint of the palp, the broad apical margin irregularly denticulate, carrying several plumose setæ; there are some long plumose setæ on the inner margin and a curved spine-tooth at its apex; outer plates nearly reaching the apex of the long second joint of the palp, inner edge almost smooth till near and at the apex, where it is serrate and armed with setæ successively increasing in length as they pass to the outer part of the apical margin; within the inner margin, at a little distance from the base, begin rows of slender spines, not very acute; the inner margin of the large second joint of the palp has abundance of long setæ; the short third joint has also several; this widens distally, and is apically set about with strong spines, some of them long, one of them finely pectinate; the fourth joint or finger seems to be absent or rudimentary.

First Gnathopods.—Side-plates quite small and inconspicuous, front margin rounded. First joint long, equal to the wrist and hand together, finely pectinate on the lower part of the almost straight hind margin, there also carrying some long plumose setæ, distally lobed in front, the lobe fringed with plumose setæ; the second joint shorter than the small oval third joint, both furred slightly on the hind margin, the third with numerous spines round the lower part of the hind and the somewhat squared apical margins; the

wrist large, twice as long as the hand, and much broader, the front margin straight and smooth, the hinder convex, fringed almost all round with strongly pectinate spines and setæ, with setæ also on its surfaces; the hand with a narrow neck, the convex front margin furred slightly, the hind margin straight; round the serrate distal half of the hand is set a fringe of spines; on the apex a little tubercle represents the finger, from the apex of the tubercle projects a nail or short sharp spine, and a cilium about twice the length of the nail.

Second Gnathopods.—Side-plates large and broad, narrowed a little distally, with cilia round the lower part of front and the lower margin. Branchial vesicles simple, not very large; marsupial plates small in the specimen examined, with cilia at intervals. First joint long, reaching below the side-plate, a little curved, the concavity facing forwards; the second and third joints very short and small, the third rather longer than the second, with an angular lappet on the outer side near the base; the wrist very elongate, all but as long as the first joint, narrowing distally but in no part broad, carrying on either side a series of very long, distant setæ, sparsely plumose with long distant cilia; the hand long and narrow, narrowest at either end, more than half the length of the wrist, which it resembles in armature, but with the upper part of the almost straight hinder margin free from setæ; there are four long setæ at the apex, one point of which projects beyond the rest, but there seems to be no representative of a finger; to the setæ in question lines could be traced running the whole length of the hand. The first joint, wrist, and hand are adapted to fold up closely side by side; to a more limited extent this is the case in the first gnathopods also.

First Peræopods.—Side-plates deeper and broader than the preceding pair, widest distally. Branchial vesicles and marsupial plates much as in the preceding pair. First joint not reaching to the end of the side-plate, distally in front slightly lobed, behind carrying a row of long plumose setæ; second joint short, hind margin furred, apex with setæ; third joint shorter than fourth, dilated, widest apically, scarcely decurrent, with setæ on both margins; fourth joint dilated, widest proximally, with setæ on front, hind, and apical margins; fifth joint shorter and very much narrower than the fourth, straight, narrowing distally, with spines or setæ at two points of each margin, and a group at the apex, at which a cilium marks the place where the finger is not, unless it be represented by a little triangular point near the cilium, within the apical margin.

Second Peræopods.—Side-plates scarcely deeper than the preceding but much broader, a little broader than deep, with no excavation behind worth calling such. First joint not reaching the end of the side-plates, with a longer row of plumose setæ on the hind margin than in the preceding pair; third joint longer and broader than the fourth, with spines at two points of the hind margin, and at the apex before and behind; the fourth joint not dilated, a little furred on the front margin, with a spine at the middle of the hind margin, and a group at its apex; the fifth joint straight, slender, narrowing a little

distally, rather longer than the fourth, with the margins smooth, not as in the preceding pair notched for the spines; at the apex a group of spines of various lengths, and a small feathered cilium; no finger apparent.

Third Peræopods.—Side-plates small, broader than deep, presenting a rounded lobe pointing forwards and upwards, and a more elongate one pointing backwards and downwards, this latter with its lower margin straight and a spine at the apex. First joint enormously larger than the side-plate, irregularly rounded, broader than deep, the hinder margin smooth, the front one with a few slender spines round the lower half; the second joint small, without spines; the third very large, equalling the length of the first, and at the centre more than half its breadth, with spines on both margins, but weak ones; the fourth joint insignificant in comparison with the third, which overlaps it partially behind, but much broader and a little longer than the fifth, with spines on the front margin, and apically behind; the fifth joint straight, with smooth margins, widening slightly towards the apex about which it carries various spines; the sixth joint short and stout, not one-third the length of the fifth joint, with a cleanly rounded, in no way pointed apex, instead of a nail carrying three spines of very different lengths, but similar in structure, each having its distal end bent forward at an obtuse angle, while the hind margin is continued on for a small distance behind the bent part, so that the effect is that of a long Wellington boot, with a delicately-shaped foot; there is one such spine among those on the fifth joint.

Fourth Peræopods.—Side-plates similar to those of the preceding pair, but shallower, with two spines on the straight lower hinder margin. Branchial vesicles small, bent directly forwards. The first joint longer than broad, wider above than below, the front margin convex, with spines at three or four points, the hind margin sinuous, the outer surface outdrawn below into a lobe which overlaps the short second joint; the third joint longer than the first, of considerable width, with the sides parallel for most of the length, the spines few and slight; the fourth joint as long as the fifth and sixth together, which closely resemble those of the preceding pair.

Fifth Peræopods.—First joint longer than wide, expanding rapidly from a narrow base, widest below; front margin slightly convex, smooth, hinder slightly serrate; third joint not longer than broad, much shorter than the first joint and not longer than the fourth, with spines on both margins; the fourth joint broader but shorter than the fifth, with groups of spines on both margins; the fifth long, straight, narrowing a little distally, with spines at three points on the front, at two on the hind margin, and a group round the apex, to which in none of the specimens was any finger attached.

Pleopods.—There are some groups of setæ on the peduncles; the two coupling spines are small, one showing four, the other three, retroverted teeth on one of the margins; the opposite margin appears to be serrate, but possibly the difference in the aspect of the two margins is due only to the point of view; the joints of the rami vary in number from seven to eleven; there is but one cleft spine to each pair.

Uropods.—Peduncles of the first pair longer than the rami, which are subequal, the outer rather the longer, each with a distal group of spines; peduncles of the second pair shorter than the longer, longer than the shorter, ramus; both rami with apical groups of spines, the longer with pectinate margin and spines at two points upon it; peduncles of the third pair much shorter than the lanceolate rami, of which the outer is a little the shorter.

Telson very long and narrow, reaching far beyond the peduncles of the third uropods, sharply tapering, cleft nearly to the base, and distally scarcely dehiscent, the apex of each half tipped with a spine.

The Length of the outstretched specimen as figured was rather over four-twentieths of an inch, of the coiled specimen as figured three-twentieths.

Locality.—Betsy Cove, Kerguelen, January 10, 1874. Four specimens.

Remarks.—The details have been figured from a female specimen. The specific name, derived from παῦροι, few, and δάκτυλος, a finger, refers to the scarcity of fingers in this creature, for they seem to be wanting in the maxillipeds, the second gnathopods, the first, second, and fifth peræopods, to be rudimentary in the first gnathopods, and very short in the third and fourth peræopods.

Genus *Phoxocephalus*, n. n.

1842. *Phoxus*, Krøyer, Naturh. Tidsskr., R. 1. Bd. iv. p. 150.
1845. ,, Krøyer, Naturh. Tidsskr., R. 2. Bd. i. p. 561.
1852. ,, Dana, U.S. Explor. Exped., vol. xiii. pt. ii. p. 913.
1852. *Urothoë* (*pars*), Dana, U.S. Explor. Exped., vol. xiii. pt. ii. p. 920.
1854. *Phoxus*, Stimpson, Marine Invert. of Grand Manan, p. 57.
1857. ,, Spence Bate, Synopsis, Ann. and Mag. Nat. Hist., ser. 2, vol. xix.
1857. ,, White, Popular Hist. Brit. Crust., p. 173.
1859. ,, Bruzelius, Skand. Amph. Gamm., p. 66.
1860. ,, Boeck, Forh. ved de Skand. Naturf. 8de Mode, p. 449.
1861. ,, Bate and Westwood, Brit. Sess. Crust., p. 139.
1862. ,, Spence Bate, Brit. Mus. Catal. Amph. Crust., p. 97.
1865. ,, Lilljeborg, On the Lysianassa magellanica, p. 18.
1870. ,, Boeck, Crust. amph. bor. et arct., p. 54.
1876. ,, Boeck, De Skand. og Arkt. Amph., p. 213.
1877. ,, Meinert, Crust. Isop., Amph., Dec. Daniæ, p. 102.
1879. ,, Sars, Crust. et Pycn. nova, p. 441.
1882. ,, Haswell, Catal. Austral. Crust., p. 236.
1882. ,, Sars, Oversigt af Norges Crustaceer, p. 84.
1885. ,, Carus, Prodr. Faunæ Mediterraneæ, p. 410.
1885. ,, Sars, Den norske Nordhavs-Exp., p. 154.
1886. ,, Gerstaecker, Bronn's Klassen und Ordnungen, Bd. v. Abth. ii. p. 501.

From Scudder's Nomenclator Zoologicus it appears that the name *Phoxus* was preoccupied among Coleoptera by Billberg in 1820; I have therefore substituted the form

Phoxocephalus in accordance with the explanatory derivation which Krøyer supplies at the institution of the genus.

For the original definition see Note on Krøyer, 1842 (p. 198). Boeck in 1870 and 1876 gives the following:—

"*First Maxillæ* with the palp one-jointed.

"*Maxillipeds* with the palp narrow, the plates small.

"*Third Peræopods* with the first joint dilated behind.

"Body compressed, deep; head produced into a broad rostrum, which towards the apex is acuminate or curved.

"*Third Uropods* with the inner ramus in the male equalling the length of the outer, in the female much shorter."

Phoxocephalus bassi, n. sp. (*Phoxus bassi*, Pl. LIV.).

Head a large triangle, longer than the breadth at the base; the rostral portion viewed laterally looks like the nib of a quill pen; it projects as far as the outstretched peduncle of the upper antennæ, of which it completely covers the first joint; the apex is blunt; the first three segments of the pleon much longer than any of the peræon-segments; their postero-lateral angles rounded; the fourth segment with a dorsal depression; the fifth very short.

Eyes large, irregularly quadrate, very dark in the spirit-preserved specimen, with very numerous, small ocelli.

Upper Antennæ.—Peduncles nearly as long as the flagella, first joint longer than the next two united, much thicker than the second, which is longer and thicker than the third; there are feathered cilia on the first joint, and a group of setæ at the inner apex; several setæ at the outer apex of the second joint have the distal part plumose; the third joint is thicker but little longer than the first of the flagellum; the eight joints of the flagellum do not differ materially in length but successively decrease in thickness, small calceoli, cylinders, short setæ and cilia are among their appendages; the accessory flagellum of five joints does not quite equal in length the first four of the primary.

Lower Antennæ.—The first joint somewhat expanded, the gland-cone obscure, third joint broad, not long, distinguished by a furry tuft on the distal part of the upper border; the fourth joint not very much longer, but much broader than the fifth, with partially feathered setæ below, and strong flat spines (each with an accessory thread) on the surface and round the distal margin, and on the surface within the upper margin a furry brush of cilia; the fifth joint with a pair of spines about the middle of the upper margin and at its apex, a few small groups of cilia along that margin, and some setæ at the apex and on the lower margin near it; the flagellum is of great tenuity, reaching nearly back to the hinder extremity of the animal; it consists of thirty-seven joints bearing calceoli on

every other one, all the first four, however, being so armed, as well as the apex of the fifth joint of the peduncle; the calceoli are very small; the last joint of the flagellum is tipped with a long seta, except under a high power scarcely distinguishable from the slender joint itself; a short thin seta or cilium attends the larger one.

Upper Lip.—The apical margin of the broad plate shows a central prominence between two small depressions, the rows of very short cilia over the central part giving it, when highly magnified, a sort of nutmeg-grater appearance.

Mandibles.—A short massive trunk, from which in the left mandible the cutting plate projects somewhat abruptly, with a strongly sloping front edge, not so much toothed as having a small unevenness above and a larger one below, the hind margin sloping upwards from the rounded apex so as to make the whole plate a sort of massive tooth: the secondary plate not much smaller, broad, with its front margin divided into four broad teeth; close behind this the spine-row consists of three strong curved ciliated spines with the tips bent hookwise; near to the spine-row is the molar tubercle, small, but compact and strong, the oval dentate crown set round with long sharp teeth; a small plumose seta at the upper corner; just over, but a long way above, the molar tubercle, the palp is placed, having just below it a small tooth-like process, which resembles Schiodte's articular condyle in the Lysianassidæ; the first joint of the palp is very small, the second large, narrowed a little distally, with five setiform spines along the upper half of the inner margin; the third joint, almost as long as the second, from a narrow base widens a little for more than half its length, with smooth margins, then narrows to the apex, having the inner margin of the narrowing tract thickly set below with setiform spines, but above and for the most part with large flat sword-spines, the two sets together numbering fourteen. In the right mandible the secondary plate has two large teeth below, and its margin above these cut into a dozen denticles, some more prominent than others; in both mandibles it is probable that the principal cutting plates, when unworn, would show dentation.

Lower Lip.—The large outer and the small but tumid inner lobes apically rounded, the outer plates finely ciliated, and having an indent on the inner margin a little below the apex; the mandibular processes short and divergent.

First Maxillæ.—Inner plate broad, with smoothly rounded apex, cilia inconspicuous; outer plate short, with nine spines on the apical margin, the innermost long, almost straight, with its upper half finely pectinate, the next shorter, with a long curved point and six lateral teeth; the next two pairs very similar to this first pair, the remaining three spines somewhat stouter; the palp one-jointed, slender, scarcely longer than the outer plate, with four long setiform spines on, and one just below, its narrow apical margin. In having nine spines on the outer plate this species agrees with Krøyer's account of *Phoxus* (*Harpinia*) *plumosus*.

Second Maxillæ.—The inner plate rather broader and scarcely shorter than the outer,

the rounded apex smooth, eight or nine short, more or less spine-like, plumose setæ along the upper part of the inner margin; the outer plate with ten longer spines round the upper part of the inner and the apical margins, and a short spine at the top of the outer margin.

Maxillipeds.—Inner plates broader than the outer, short, reaching a little beyond the base of the first joint of the palp, with three spine-teeth and two spines on the apical border; the outer plates narrow, not reaching quite to the end of the first joint of the palp, on the inner margin carrying a single spine, a pair of spines, five spine-teeth, successively larger towards the apex, upon which is a long spine-tooth and a plumose seta; the first joint of the palp rather longer than the third; the second joint considerably longer than either, with the convex inner margin fringed with numerous slender spines; the third joint narrow, oval, with spines along the inner margin, on the surface near the outer, and at the apex of the outer margin; the finger slender, nearly as long as the third joint, inner margin straight and smooth, a spine rather than a nail affixed to the apex, with an attendant cilium; the dorsal cilium small, near the base.

First Gnathopods.—Side-plates expanded in front below, hind margin nearly straight, lower margin fringed with some fourteen partially feathered setæ, leaving a third of the length in front unarmed except for a single cilium; the first joint reaching the end of the side-plate, with six long setæ along the central part of the convex hind margin; the second joint narrow, as long as the triangular third, of which the front margin is much longer than the hinder one; the wrist, a little shorter than the hand, to which it is attached by a narrow neck, carries a few setæ on the somewhat expanded part of the hind margin just below the third joint; the hand oblong, the front margin a little prolonged at the root of the finger, where it has two or three cilia or setules; the hind margin is a little indented for its second setule a little below the apex; the broad palm consists of a small rounded lobe in front, beyond which the strong palmar spine a little projects, while the small lobe is followed by a broad, slightly convex, margin, bordered on both sides with numerous spinules or setules; the finger is bulbous at the base, the remainder slender, curved in correspondence with the convexity of the palm-margin, the nail being protected by a projecting cap; the cap being in this, as in many other similar examples, much more delicate than the nail, has probably some sensitive function.

Second Gnathopods.—Side-plates similar to those of the preceding segment, but broader above and therefore more squared. The branchial vesicles of delicate texture, an elongate oval attached to a narrow neck. The first joint reaching beyond the side-plate, with setæ on both margins; the second joint scarcely as long as the third, which is roughly quadrate and combines with the triangular wrist to form a cup for the broad hand; the wrist forms a bent triangle, the lower apex of which is attached to the base of the front margin of the hand as in the genus *Eusirus*, Kroyer, while the base adjoins the front margin of the preceding joint, this front margin being, however, no doubt

homologically not the front but the lower margin; the hand is constructed and armed on the same plan as in the first pair, but is of enormously greater breadth, exceeding the breadth of the side-plate as well as its own length; it is rather wider at the palm than at the rounded base, and the incision in the palm-margin near the palmar spine is very deep; the size of the finger matches the requirements of the increased palm.

First Peræopods.—Side-plates evenly oblong, armed as in the preceding pairs. Branchial vesicles as with the preceding pair, but rather larger. First joint reaching but little beyond the side-plate, with some very long setæ on the lower part of the convex hind margin; the second joint short, the third long, broad, as long as the fourth and fifth together, with setæ on the hind, and apex of the front, margin; fourth joint oval, narrower distally than at the base, shorter but broader than the fifth joint, the hind margin fringed with long setæ and carrying at the apex a long thick spine, nearly equal in length to the fifth joint; the fifth joint slender, of nearly even width throughout, fringed with setæ on the hind margin and carrying four stout spines of different lengths near its apex; the finger not half the length of the fifth joint, of unimportant appearance among the neighbouring spines.

Second Peræopods.—Side-plates very broad, a little deeper than broad, excavation behind descending a very small distance, lower margin carrying setæ as in the preceding segments, joining the hind margin with a gentle curve. First joint not reaching the end of the side-plate; details of the limb similar to those of the preceding pair.

Third Peræopods.—Side-plates much broader than deep, hind lobe narrower but deeper than the front one. Branchial vesicles broadest above, forming a triangle with the neck at one corner of the base. The first joint broadest above, almost oval, but that the front margin is nearly straight; the setæ along this are short at the upper and long at the lower part of it, the hind margin is almost entirely smooth and unarmed; the second joint short; the third not long, broad, with setæ along most of the front margin, spines and setæ at and near the apex behind; the fourth equal in length to the third, a little less broad, with setæ on both margins, various groups of spines on the front and at the apex of the hind margin; the fifth joint longer and thinner than the fourth, the armature of the same character; the finger more than half the length of the fifth joint, more like a great spine than a joint, at the tip curved a little forward, near the somewhat thickened base carrying two dorsal cilia, one feathered in the usual way, the other pectinate with long teeth.

Fourth Peræopods much longer than the third or fifth. Side-plates very shallow, much broader than deep. First joint broadly oval, with numerous and long setæ on the convex front margin, the hinder almost unarmed; the third joint subequal in length to the fifth, with spines and setæ on both margins; fourth joint a little shorter, with setæ on the hind margin, spines on the front, and apex of the hind, margin; fifth joint slender and straight, with spines and setæ on the hind, spines on the front margin, an apical

spine in front and an apical seta behind nearly as long as the slender finger; the finger is more than half the length of the fifth joint, and has two dorsal feathered cilia.

Fifth Peræopods.—Side-plates small. First joint greatly dilated, front margin smooth, with an apical spine, hind margin slightly serrate; the broad lower margin behind and below the second joint is smooth; the third joint much shorter than the fourth, with setæ on the front margin, the lower ones long and plumose, a group also on the apex behind; the fourth joint a little longer than the fifth, and much broader, with numerous feathered setæ along the front, and distally and apically on the hinder margin; the fifth joint with setæ on both margins; the finger more than half the length of the fifth joint, with one dorsal cilium.

Pleopods.—The coupling spines have an oval bulbous base, followed by a narrow shaft with three small lateral retroverted teeth and a sharply bent tip; the pair is accompanied by a plumose seta. The cleft spines are three in number on the first joint of each inner ramus; the joints number sixteen on the outer, thirteen on the inner ramus.

Uropods.—Peduncles of the first pair a little longer than the rami, with six or seven slender spines along the upper margin; the rami subequal, with a couple of spines on the proximal half of the upper margin; peduncles of the second pair stout, equal in length to the longer ramus, with seven spines on the upper and two near the lower margin; the longer ramus with three spines on the proximal part of the upper margin, the shorter ramus smooth; peduncles of the third pair short, distally set with spines, the rami long, lanceolate, subequal, the lower with a narrow nail tipped with two setæ; plumose setæ round most of both margins of both rami, that with the nail having also short spines along the inner margin.

Telson extending beyond the peduncles of the third uropods, much longer than broad, not tapering, cleft almost to the root, dehiscent for some distance, though not widely except where the margins curve outwards to form the rounded apices; there is a slight contraction below the centre, the outer margins being here armed with a small row of setiform spines; on the outer side of each apex a small cavity contains a spine and a cilium.

Length.—The specimen, in the position figured, measured two-fifths of an inch.

Locality.—Station 162, April 2, 1874; Bass Strait; depth, 38 fathoms; bottom, sand and shells; surface temperature, 63°·2. One specimen, surface.

Remarks.—The specific name refers to the place of capture. That the specimen was a male may be taken for granted from the structure of the lower antennæ. From *Phoxus villosus*, Haswell, this species differs in the size and shape of the eyes, in the flagella of the upper antennæ, in the relative sizes of the gnathopods, and in the third and fourth joints of the second gnathopods; from *Phoxus batei*, Haswell, it differs in regard to the eyes, the peduncles of the upper antennæ, the gnathopods, and the ramiof the third uropods.

Phoxocephalus kergueleni, n. sp. (*Phoxus kergueleni*, Pl. LV.).

The rostral part of the head projecting with a tolerably sharp apex over the peduncle of the upper antennæ; the first three segments of the pleon each longer than any segment of the peræon; their postero-lateral angles rounded, the lower border of the third long and for the most part straight.

Eyes small, distant, in the spirit-preserved specimens not dark, with few ocelli.

Upper Antennæ.—First joint considerably longer than the next two united, its breadth little less than its length, distally a little outdrawn on one side; second joint longer and broader than third, each of a length about equal to its breadth; the flagellum of five articulations; the first equalling in length the last of the peduncle and also the last of the flagellum; the secondary flagellum of three joints, the three together equalling the first two of the primary.

Lower Antennæ.—First joint not much expanded, gland-cone obscure, seemingly with a broad apex, third joint not very short, the fourth broad, with marginal setæ and apical and surface spines; the fifth half the length of the fourth in the male, more than half in the female, expanding distally, broader in the male than in the female; the flagellum in the male specimen examined had fifteen joints, moderately thick, with quite inconspicuous cilia, except two short ones on the tip of the last joint; in the female this flagellum had five slender joints.

Upper Lip.—The broad apical border slightly emarginate.

Mandibles.—Similar to those of *Phoxocephalus bassi;* the cutting plate, however, here on both mandibles showing both above, below, and on the oblique margin a certain amount of dentation, one tooth below being prominent and large, especially on the right mandible; the secondary plate of the left mandible has its margin divided into five teeth; on the right mandible it has two sharp teeth below and a row of denticles above; the spine-row of each mandible contains three curved spines; the palp, as in *Phoxocephalus bassi,* is much longer than the trunk; its third joint in the male was as long as the second, but in the female not so long; there are three or four spines along the upper part of the inner margin of the second joint, and nine on the apical part of the third joint.

Lower Lip small and compact, with the mandibular processes seemingly less divergent than in *Phoxocephalus bassi.*

First Maxillæ.—Inner plate oval, smooth; outer plate short, with seven spines on the rather oblique apical margin, the spines similar in character to those of *Phoxocephalus bassi;* the one-jointed palp narrow, but little overtopping the outer plate, with four long setæ on the apex. In having seven spines on the outer plate this species agrees with Krøyer's account of *Phoxus holbölli.*

Second Maxillæ.—The outer plate extending a very little beyond the inner, each

with few apical setæ, those of the outer plate the longer, those of the inner extending more down the inner margin.

Maxillipeds.—Inner plates not reaching much beyond the base of the first joint of the palp, with two spines on the apical, and one on the inner margin; outer plates narrow, not reaching the end of the first joint of the palp, the inner margin carrying two small setæ and three spine-teeth, the largest of these being apical; the first joint of the palp subequal in length to the third, the second joint longer than either, with seven or eight setæ on or near the inner margin; the third joint with about the same number of setæ distributed over it; the fourth joint as long as the third, finger-formed, but with the inner margin not concave; the dorsal cilium short, the nail short and sharp, spine-like, with a couple of cilia near it on the inner margin.

First Gnathopods.—Side-plates expanded below, the hinder part of the lower margin carrying five setæ and a cilium, another cilium also in advance of the setæ. The first joint not reaching below the side-plate, carrying five setæ, four of them very long, on the hind margin; second joint as long as the third; the third rather broader above than below, with a small process filling up the narrow space in front between the second and fourth joints; the wrist not quite so long as the second and third joints together, broader above than below, with a group of setæ at the top of its free hind margin, its lower apex attached to the front margin of the hand, which seems partially to rest on its free hind margin; the hand oblong, broad, muscular, the front margin longer than the hinder, which is outdrawn into a small tooth-process; on this is seated a strong spine, not reached by the tip of the finger when closed over the convex, ciliated palm; there are two cilia on the hind margin, one on the apex in front; a short dorsal cilium on the finger.

Second Gnathopods.—Side-plates oblong, distally less broad than those of the first segment, similarly armed. The branchial vesicle narrow, nearly as long as the first joint of the limb; the marsupial plates in the female narrower than the branchiæ, of the same length, with a few long setæ on the front margin. The joints of the limb similar to those of the first gnathopods, but larger, the third joint longer than the second and as long as the wrist, with which it forms a small cup for the broad, muscular, oblong hand, which in both sexes greatly exceeds the size of the hand of the first pair, the palm margin being also more oblique, and its tooth process stronger.

First Peræopods.—Side-plates like those of the preceding segment. Branchial vesicles oval, longer and broader than the first joint of the limb. First joint reaching fully as far down as the side-plate, with setæ on the convex hind margin; third joint subequal in length to the fourth and fifth together, with setæ on the hind margin; fourth joint rather shorter than the fifth, narrower than the third, oval, with setæ and spines on the hind margin, an apical spine longer than the fifth joint; the fifth joint narrow, with one seta at the centre, and a group of spines and setæ at the apex, of the hind

margin; the finger more than half the length of the fifth joint, with a small cap projecting little beyond its bent tip.

Second Peræopods.—Side-plates nearly as broad as long, very slightly excavated behind, with only two or three setæ on the lower margin. Branchial vesicles broader than in the preceding pair. First joint not reaching the end of the side-plate; the limb not materially differing from the first peræopods.

Third Peræopods.—Side-plates broad, front lobe shallow, hinder much deeper. Branchial vesicles broader but perhaps a little shorter than those of the preceding segment. The first joint evenly expanded, longer than broad, the front margin rather sinuous, armed with some long setæ near the lower apex, the hind margin smoothly convex, with a minute cilium here and there, the lower rounded behind and overlapping the short second joint; the third joint as long as the fifth; the fourth joint a little shorter than either, and in breadth intermediate; all these three have setæ or spines on the front margins and at the apices both behind and in front; the finger slender, acute, but little shorter than the fifth joint.

Fourth Peræopods much longer than the third or fifth. Branchial vesicles small, of rounded oval shape. First joint large, wider above than below, longer than wide, front margin convex, with small cilia on the upper part, but most of it fringed with groups of long setæ, the long hind margin nearly straight, interrupted only by three or four minute cilia, the lower margin rounded and overlapping the second joint behind; the third joint exceeding the fourth in length, the fourth the fifth, and the fifth the sixth, about equally in each case, not greatly; the third armed on both margins, the fourth only on the front, the fifth on neither, but all on the apices before and behind; the finger slender, curved at the tip, with a little cap upon it.

Fifth Peræopods.—Side-plates small. First joint of the limb greatly expanded, especially below, breadth greater than the length, lower margin behind descending far below the almost straight front margin, which has two or three setæ, three or four cilia and an apical spine; part of the hinder and of the lower margin is serrate; the third joint a little longer than the fourth, has a straight hind margin with two spines at, and one a little above, the apex; the hind margin of the fourth joint is convex with similar armature; both of these joints carry setæ or spines in front and are laid back against the wing of the first joint, not nearly reaching its hind margin; the fifth joint shorter and much narrower than the fourth, has two convex smooth margins, and a lower margin cap-like over the hinge of the finger with a minutely pectinate edge; the finger is as long as the fifth joint, or as its apical spines.

Pleopods.—The peduncles have, together with a plumose seta, a pair of coupling spines with very slender stalks on small basal bulbs; these spines have three minute retroverted teeth and an apical hook; the cleft spines are three in number, one arm of the cleft much longer than the other; the joints of the rami number from nine to eleven.

Uropods.—Peduncles of the first pair subequal to the rami; the longer of the two rami with two or three spines on the upper margin, the shorter with none; the second pair smaller than the first, the peduncles with one rather prominent apical spine; the rami without spines, equal in length to one another and to the peduncle; peduncles of the third pair shorter than the rami, carrying some apical spines; the rami lanceolate, the outer longer than the inner by almost the length of its long slender nail, which has a couple of cilia at its tip, and spines on either side of the base; there is also a small spine on the outer margin of the longer ramus, the shorter has a cilium at its tip.

Telson extending a little beyond the peduncles of the third uropods, cleft beyond the middle, the apices somewhat divergent, each armed with a long spine, and a cilium outside of the spine; the outer margins appear to be evenly convex and unarmed; the length not greatly exceeding the breadth.

The Length of the female specimen, in the position figured, was rather less than one-fifth of an inch. The details were figured from a male specimen, with the exception of the lower antennæ of the female.

Locality.—Off Cumberland Bay, Kerguelen, at a depth of 120 fathoms. Several specimens.

Remarks.—The specific name is derived from the place of capture.

A dark-coloured specimen, less than a tenth of an inch in length, from Marion Island, appears to be of this species, though presenting some differences.

The present species differs from *Phoxocephalus bassi* in many particulars, but the gnathopods alone suffice to distinguish the one species from the other.

Genus *Harpinia*, Boeck, 1876.

1842. *Phoxus* (*pars*), Kroyer, Naturh. Tidsskr. R. i. Bd. iv. p. 150.
1845. „ Kroyer, Naturh. Tidsskr. R. ii. Bd. i. p. 551.
1870. *Harpina*, Boeck, Crust. amph. bor. et arct., p. 55.
1876. *Harpinia*, Boeck, De Skand. og Arkt. Amph., p. 218.
1877. *Harpina*, Meinert, Crust. Isop. Amph. et Decap. Daniæ, p. 106.
1879. *Harpinia*, Sars, Crust. et Pycn. nova, p. 443.
1884. „ Schneider, Crust. og Pycn. Kvænangsfjorden, p. 70.
1885. „ Sars, Den norske Nordhavs-Exp., p. 157.

For Boeck's definition of the genus see Note on Boeck, 1870 (p. 400). Gerstaecker in 1886 makes *Harpina*, Boeck, a synonym of *Phoxus*, Kroyer, but in the definition he includes as a character, "die drei hinteren Beinpaare mit lamellös erweitertem Schenkelglied," which is unsuitable to *Harpinia*, since there the first joint of the third peræopods is not expanded. *Phoxus plumosus*, Kroyer, is the type species of Boeck's *Harpinia*, so that the writers prior to 1870 who have mentioned *Phoxus plumosus*, as Spence Bate, Goës, &c., might be included in the above synonymy.

Harpinia obtusifrons, n. sp. (Pl. LVI.).

Rostral portion of the head broadly rounded, reaching to the apices of the peduncles of the upper antennæ. The head broad at the base, longer than broad, the sides a little sinuous, with a conical plate underneath, situate outside the base of the upper antennæ; postero-lateral angles of the third pleon-segment upturned, forming a rather long sharp tooth, the lower boundary of a deep cavity in the hind margin of the segment; the sides of the sixth segment are produced some way along the telson.

Eyes not perceived.

Upper Antennæ.—First joint of the peduncle bulky, widest at the base, the inner border smooth, convex, the other sinuous, with four broad distally feathered cilia at the apex; the second joint small, not twice as long as broad, with long setæ and a plumose cilium on the outer apex; the third joint much shorter and narrower, with setæ at the apex on both sides; the flagellum slender, of seven joints, the first the longest, a little shorter than the second of the peduncle; the secondary flagellum of five joints, nearly equal in thickness as well as length to the first five of the primary.

Lower Antennæ.—The first joint is bent round at right angles to its base, with a distally narrowed process on the outer side, the piece which appears to correspond to the coalescent second joint being rounded on the outer margin, not in any way produced either conically or otherwise; the third joint is nearly as long as the fourth, it has a group of setæ on the lower part of the outer margin; the fourth joint widens distally, round the apical border armed with rows of long setæ, setiform spines, and two stronger spines, on the inner border above having a group of three small spines; the fifth joint much narrower and a little shorter, has a straight smooth inner margin, the outer convex, armed with setæ and two spines near the apex; the flagellum shorter than the peduncle, of eight joints, of which the first is the longest.

Upper Lip widening to a broad distal margin.

Mandibles with a longer trunk than in the genus *Phoxocephalus;* the cutting edge on the left mandible showing a tooth above, then a long oblique margin without prominent dentation, ending with a bidentate apex, the whole plate being itself more or less tooth-like; the secondary plate broad, widening slightly to the front edge, which is cut into six teeth, the lowest being the longest; the spine-row is long, showing amongst some accompanying cilia nine curved denticulate spines, the last a very small one; the molar tubercle appears to be rather broad, but weak in structure, and unarmed; the cutting edge on the right mandible has a tooth above, an oblique, slightly concave, almost invisibly denticulate, margin, forming at the apex a large sharp tooth, with a little one considerably in the rear below; the secondary plate is very different from that of the left mandible and much smaller, presenting below a spine-like tooth and

above a shorter broader piece cut distally into three denticles; the spine-row appears to consist on this side of only seven spines; the palp, much longer than the body of the mandible, is attached to the front over the base of the cutting edge; the first joint is short, though not unusually so; the second is broader, but slightly shorter, than the third, carrying three or four short setæ on the outer margin; the long slender third joint has its sides unarmed, and carries ten spines of different lengths on the obliquely truncate definite apical margin. In *Phoxus plumosus* Kroyer describes the molar tubercle as insignificant, without teeth, but furnished with three or four long and strong setæ.

Lower Lip.—The plates are very broad at the base, with small and narrow mandibular processes, the forward lobes being rounded, not strongly ciliated, though some of the cilia are long, the rounded apical margin being produced on the inner side into a conical tooth traversed by a duct which apparently opens at the apex of the tooth.

First Maxillæ.—Inner plate with sinuous inner margin carrying a spiniform cilium, above which is a plumose seta, followed at a distance on the apex by a larger one; outer plate short, carrying on the truncate apex nine spines, three pairs with one spine long and multidentate attended by a short one with a single lateral tooth, and an outer group of three in which the longest and strongest is not denticulate; the long rather narrow second joint of the palp overtopping the outer plate, and carrying a double row of slender spines on its apex. The border which connects the two members of this pair of maxillæ is surmounted by a row of seven setæ.

Lower Maxillæ.—The plates are somewhat curved, the inner not much shorter than the outer, with ten or eleven plumose setæ round the upper part of the inner margin and the rounded apex, several of them being pectinate in the upper part as well as plumose; the longest are not those lowest on the inner margin, but the two placed where the inner margin passes into the apical; the outer plate has some sixteen spines or setæ passing round the apex and upper part of each lateral margin, the smallest of the spines being on the outer side.

Maxillipeds.—The inner plates not reaching nearly to the end of the first joint of the palp, the inner margin unarmed, the rounded apex carrying four plumose setæ, the outer surface having a single spine-tooth just within the inner margin and below the apex; the outer plates long and narrow, reaching to the middle of the second joint of the palp, armed on the inner margin with some fourteen spine-teeth and round the outer margin with long plumose setæ, about seven in number; the spine-teeth gradually increase in size to the apical one, which is the largest, each near its own apex being delicately pectinate on both sides for a short distance, some of the upper being also slightly plumose; the first joint of the palp is almost as long as the third, the second is nearly twice as long, armed on the inner border with numerous pairs of spines; the

third joint armed on the inner and apical margins, and on the upper part of the outer margin; the finger slender, slightly curved, in conjunction with its long spine-like nail fully equalling the length of the third joint; there are two cilia at the base of the nail on the inner side.

First Gnathopods.—Side-plates broad, expanded below, with a score of cilia round the lower margin. First joint rather broad, reaching below the side-plate, with some setæ near the centre of the convex hind margin and at its apex; second joint shorter than the third, the front, or properly lower, margin of which adjoins the hind margin of the wrist; the hinder margins of the third joint and of the wrist have setæ on the lower part; the hand is broad, with the front margin continuing the curve of the wrist and then becoming almost straight, giving a length to the hand not much less than that of the first joint, the hind margin being very much shorter, ending in a very shallow tooth carrying a long palmar spine, the palm being convex, very oblique, ciliated; a few small setæ are on the surface of the hand, and one on each lateral margin, besides longer ones at the front apex; the finger is curved, reaching to the cavity between the tooth and convex margin of the palm, and carrying a short dorsal cilium near the middle.

Second Gnathopods.—Side-plates oblong, the hinder margin straight, the front a little sinuous, the lower furnished with a dozen setæ. The marsupial plates narrow, as long as the side-plates, with long setæ on the front and apical margins. The first joint of the limb broad, reaching the lower border of the side-plate, with six long setæ on the central part, and a tuft at the apex, of the hind margin, the limb in general similar to that of the first gnathopods, but more massive, the wrist relatively smaller, the tooth of the palm larger, and the following palm-margin sinuous, being at first concave and then convex; the hand in front subequal in length to the first joint.

First Peræopods.—The side-plates similar to those of the preceding segment, but larger, with fifteen setæ on the lower margin. The first joint reaching the lower margin of the side-plate, carrying four long setæ at the centre, and as many in a group at the apex, of the hind margin; third joint broad and long, but not as long as the fourth and fifth together, with numerous setæ along the hind margin and a tuft at the apex in front; the fourth joint oval, shorter than the fifth, bordered behind with numerous spines, those near the apex being longer than the fifth joint; the fifth joint narrow, of even width throughout, slightly curved, bordered behind with spines; the finger slender, curved, more than half the length of the fifth joint.

Second Peræopods.—The side-plates very broad, broader than long, not deeply excavate behind, with four and twenty short setæ on the lower margin. The first joint not reaching the end of the side-plate, with half a dozen setæ on the hind margin, the lowest two very long, some short setæ on the upper part of the front margin; the limb in general similar to that of the first peræopods.

Third Peræopods.—The side-plates almost concealed under those of the preceding segment. The first joint not expanded, the margins almost parallel, seven small setæ along the front, and a tuft of longer ones at its apex; second joint short, with setæ in front; the third, fourth, and fifth subequal in length, the fourth rather shorter than the other two, intermediate in breadth, all three armed on both margins with groups of setæ and spines; the fifth joint somewhat tapering, its apical spines not so long as the slender, slightly curved finger, which is more than half the length of the fifth joint; several of the setæ on this limb are very long and plumose, especially at the back of the fourth and fifth joints.

Fourth Peræopods very much longer than the third or fifth. The first joint broadest above, armed all round the convex front margin with setæ and spines, the hinder margin smooth, lobed above, then straight or slightly concave; a pocket is marked in the surface of the integument at the upper part in front: the second joint short; the third long, straight, with spines on both margins, those at the apex strong, and the hinder ones also long; the fourth joint rather longer and narrower than the third, similarly armed, its hinder margin very slightly concave; the fifth joint slender, longer than the preceding, its hind margin rather more concave, carrying some long setæ, the front margin correspondingly convex, fringed with slender spines of different lengths, the finger very slender, long and straight; in one specimen, apparently belonging to this species, the finger is as long as the preceding joint.

Fifth Peræopods.—The first joint greatly expanded, and behind outdrawn much below the second joint; the front border comparatively short, fringed with spines, the lower part of the hind border serrate, and the lower border also serrate but in the opposite direction, spiny cilia in the serratures; the second joint comparatively large, with the front margin very convex, and having its lower half fringed with spines which at the apex are very long; the third joint longer and much stouter than either the fourth or the fifth, with long spines on much of the front, and on the lower part of the hind margin, one on the hind apex being longer than the fourth joint; the fourth joint shorter and broader than the fifth, spined at three points in front, and at two behind, one of the apical spines as long as the fifth joint, which is spined in a similar manner, and has an apical spine nearly as long as the finger; the finger slender, nearly straight, subequal in length to the fifth joint, which has some pectination on the apical margin.

Pleopods.—A row of five setæ was observed on the peduncle at about the centre, the two coupling hooks were also seen to be round-headed, bent so as to form a sharp strong hook, seemingly without other dentation; the cleft spines were three in number on the one pleopod examined; the joints of the inner ramus being twelve, those of the outer fifteen in number.

Uropods.—Peduncles of the first pair somewhat longer than the rami, fringed with spines of various lengths, the longer above, at the apex carrying one very stout spine

on either side; the longer ramus carrying spines on both margins, but none near the apex, the shorter ramus with spines only on one margin; the peduncles of the second pair shorter than the rami, with some slender spines on the margins, and a shorter, stout, somewhat curved one at the apex; the rami not very unequal in length, with a few spines near the centre of the margin; peduncles of the third pair much shorter than the rami, with several spines about the apex; the upper and inner ramus shorter than the lower, broad at the base, but tapering to a sharp point which is formed by an apical spine, its only armature; the lower and outer ramus ending in a long nail, with a spine on either side of its base; this ramus has three other spines on the outer margin and one other on the inner, not far above the base of the nail.

Telson.—Not reaching to the end of the peduncles of the third uropods; breadth at the base rather greater than the length; cleft nearly to the root, not dehiscent; sides converging to the broad apices, each of which has a couple of cilia on the outer part which is not carried back quite so far as the inner; there are two other unequal cilia on the surface near the outer margin not halfway down.

Length.—The specimen, a female, in the position figured, measured a quarter of an inch.

Locality.—Kerguelen. Four specimens, to two of which the depth assigned was 120 fathoms, and to one 30 fathoms; the depth at which the other was taken not being specified.

Remarks.—The specific name, from *obtusus*, blunt, and *frons*, forehead, refers to the breadth of the rostral portion of the head.

There is a strong general resemblance between this species and *Harpinia plumosa*, Kroyer, but it differs from that species in numerous details; for example, the outer plate of the maxillipeds has many more teeth, and the telson is not cleft quite to the root.

Genus *Urothoë*, Dana, 1852.

1852. *Urothoe*, Dana, Amer. Journ. Sci. and Arts, ser. 2, vol. xiv.
1852. ,, Dana, U.S. Explor. Exped., vol. xiii. pt. ii. pp. 908, 920.
1853. *Egidia*, Costa, Rend. d. Soc. r. Borb. Acad. d. scienze.
1857. ,, Costa, Ricerche sui Crost. Amfip. Nap., pp. 174, 190.
1857. *Sulcator* (*pars*), Spence Bate, Synopsis, Ann. and Mag. Nat. Hist., ser. 2, vol. xix. p. 9.[1]
1857. ,, White, Popular Hist. Brit. Crust., p. 175.
1857. *Urothoë*, Spence Bate, Synopsis, Ann. and Mag. Nat. Hist., ser. 2, vol. xix. p. 14.[1]
1857. ,, White, Popular Hist. Brit. Crust., p. 186.
1860. ,, Boeck, Skand. Naturf. 8de Mode, p. 646.
1862. ,, Spence Bate, Brit. Mus. Catal. Amph. Crust., p. 114.

[1] This is the paging of the separate copies.

1862. *Urothoe*, Bate and Westwood, Brit. Sess. Crust., vol. i. p. 192.
1865. *Urothoë*, Lilljeborg, On Lysianassa magellanica, p. 18.
1870. ,, Boeck, Crust. amph. bor. et arct., p. 57.
1876. ,, Boeck, De Skand. og Arkt. Amph., p. 224.
1876. ,, Giard, Comptes Rendus, Jan. 3, p. 76; Ann. and Mag. Nat. Hist., ser. 4, vol. xvii. p. 261.
1879. ,, Sars, Crust. et Pyen. nova, p. 446.
1885. ,, Sars, Den norske Nordhavs-Exp., p. 164.
1886. ,, Gerstaecker, Bronn's Klassen und Ordnungen, Bd. v. Abth. ii. p. 501.
1887. ,, Chevreux, Catal. Amph. Bretagne, p. 10.

For the original definition of the genus see Note on Dana, 1852 (p. 257). Dana placed it along with *Anonyx* in the subfamily Lysianassinæ. Costa placed *Egidia* in the Gammarini, the fourth subfamily of the Gammaridei. Spence Bate in 1862 placed *Urothoë* between *Sulcator* and *Liljeborgia*. The identity between *Egidia* and *Urothoë* was detected by Boeck, who in 1870 and 1876 thus defines the genus :—

"*Mandibles* apically only a little dentate.

"*First Maxillæ* with the palp two-jointed ; the two joints of nearly equal length.

"*Maxillipeds* with the second joint of the palp much dilated on the inner side.

"*First* and *Second Gnathopods* with the hand small, subcheliform.

"*Third Peræopods* with very broad joints.

"*Third Uropods* with the outer ramus a trifle longer than the inner.

"*Telson* cleft to the base.

"Body much depressed, broad ; the head in front only a little produced and rounded ; the side-plates narrow."

Urothoë lachneëssa, n. sp. (Pl. LVII.).

Head broad at the base behind the upper antennæ, in front of the insertion of which it is laterally flattened, the upper surface bending down over the base of the upper antennæ in a broad rostral portion, of which the distal margin forms an obtuse angle with a rounded apex ; the peræon broad and like all the rest of the back covered with a sort of bristly down ; the first three segments of the pleon longer but narrower than those of the peræon ; the postero-lateral angles of the third segment presenting a slightly outdrawn rounded point, with a deep re-entering angle above it.

No *Eyes* perceived.

Upper Antennæ.—First joint a little longer and a good deal thicker than the second, the second longer and thicker than the third, the third not as long as the first three joints of the flagellum ; the flagellum of five joints, of which the third is the longest ; one or two short cylinders were seen on these joints ; the secondary flagellum of two joints, the first nearly as long as the first two of the primary, the second shorter and much thinner.

Lower Antennæ.—Gland-cone not very prominent, third joint shorter than the fifth, somewhat curved; fourth joint longer than fifth, with the lower part thickened, the lower distal margin carrying setæ and an oblique row of four strong slightly bent spines, alternately long and short; the fifth joint with the upper margin straight, the lower apical oblique, armed like that of the preceding joint; the flagellum two-jointed, the first not longer and not a great deal broader than the longest of the spines on the apex of the peduncle, the second joint much shorter, tipped with two cilia and the rudiment of a third joint. In a second specimen the flagellum was definitely three-jointed.

Upper Lip.—The broad distally widened plate seems to be without cilia on the foremost edge, which has a small incision on each side.

Mandibles.—The part in front of the palp and molar tubercle presents the appearance of a large, bent, blunt tooth; the apical part of this is found to show a line marking off the cutting plate, which shows the traces of a tooth above and below with a rounded edge between; there is also a squared secondary plate, rather broader at the base than at the distal edge; it would be natural to expect to find this secondary plate on the left mandible, but it certainly appears to me to be on the right mandible, and the figure of the mandible containing it will be found on the right hand in the Plate, although that on the left hand, both from the absence of a secondary plate and the shape of the molar tubercle, looks far more like a right mandible. The preparatory growth seen within the transparent skin shows on both mandibles an edging to the cutting plate of numerous small teeth turned backwards, while the secondary plate above mentioned shows a border cut into four teeth. The enlarged figure, *m.*A., is from the second specimen already alluded to. The molar tubercle is prominent and powerful, but apparently set with but few teeth and many cilia. The palp is very slight in structure, fixed a little above the molar tubercle, the first joint as long as the third or nearly so, the second only slightly longer than the third, and on one side in the second specimen actually shorter; the third joint is apically tipped with two unequal setæ.

Lower Lip of delicate structure, the forward lobes very broadly rounded, with a lozenge-shaped interval between them, which is to a great extent covered by the inner lobes, also broadly rounded but not dehiscent; the mandibular processes divergent, with rounded ends.

First Maxillæ.—Inner plate small, without setæ on the narrow apex; outer plate having the truncate apical margin occupied by nine spines of no great stoutness, two of them apically bifurcate; the palp, reaching little beyond the outer plate, and not beyond its spines, consists of two joints, the second scarcely exceeding the first in length, tipped with three or four setæ.

Second Maxillæ.—The outer plate longer and broader than the inner, both with slender spines on the rounded apices, the inner plate having also one or two on the inner margin below the apex.

Maxillipeds.—Inner plates not reaching quite the end of the first joint of the palp, carrying on the apical margin two or three slender spine-teeth and some small setæ; the outer plates not equalling in breadth the second joint of the palp, nor reaching so far forward, the inner margin armed with setæ and six or seven curved spines, increasing in size successively to the apex; the first joint of the palp short, with a seta at the inner apex, the second joint long and broad, especially at the distal end, which forms a produced lobe on the inner side; much of its inner margin is bordered with bristles directed backwards, and from its surface start some very long ones, the whole apparatus of setæ and spines in this pair of appendages making a very close network; the third joint longer than the first, expanded distally; the finger narrow, curved, ending in a little peak, from beneath which issue a thin spine and a cilium.

The *triturating organs* of the stomach exhibit on the inner margin four or five serrate teeth, more or less curved, and succeeded below by a tuft of long cilia.

First Gnathopods.—Side-plates small, expanded below, the front part downy like the back of the animal. The first joint reaching much beyond the side-plate, slender, equal in length to the four following joints together, with some long setæ on the hind margin; second joint very short; third not much longer, distally pointed; the wrist longer and broader than the hand, its hind margin fringed with bristles of various lengths, a row of these also on the surface, the lower margin making a sharp angle with the hinder; the cross-banding of the principal muscles in this joint very conspicuous; the hand oval, narrow at both ends, more bowed behind than in front, some setæ or seta-like spines on the hind margin and surface; the finger thin, and long enough with a slight inclination of the hand to touch the wrist, while what may be considered the palm-margin is defined by a minute emargination and a spine with a long accessory thread at about the middle of the hand's hinder margin. In the second specimen the finger was longer and more curved than in that figured.

Second Gnathopods.—Side-plates narrow, distally rounded, with a pocket in the integument near the upper front border; the front half of the surface very hairy. The branchial vesicle long and narrow. The first joint reaching much beyond the side-plate, longer than the branchial vesicle, but not so long as the four following joints united, with some long setæ on the hind margin; the second and third joints like those of the preceding limb, the wrist more slender, with fewer setæ, but both margins, as also those of the hand and the upper margin of the finger, are lined with adpressed scale-like cilia; the hand shorter than the wrist, the hind margin not out-bowed, but forming a definite angle at the beginning of the palm, occupied by two palmar spines, against which the small finger closes down over the ciliated palm; both about the base and about the tip of the finger the hand has several seta-like spines.

First Peræopods.—The side-plates with convex front border, rounded below. The first joint reaching below the side-plate, the second short, the third longer than the fourth

or fifth, with groups of long setæ on the lower part of the hind margin and apex in front; the fourth joint equal to the fifth in length, but much broader, with setæ near the middle of the hind margin and low down on the front margin, and behind, near the juncture with the fifth joint, four broad spines, the lower pair as long as the fifth joint, which is straight, armed in front below with six strong spines; the finger is nearly as long as the preceding joint, minutely pectinate on the inner margin, which runs out into a little tooth before reaching the nail.

Second Peræopods.—Side-plates little longer, though considerably broader than those of the preceding segment, the hinder margin concave. The branchial vesicle very long, not broad. The first joint reaching below the side-plate, but it must not be supposed that the figures in the Plate, drawn from flattened dissections, represent the relations of limb and side-plate in this broad-backed animal when whole. This limb has the joints somewhat longer than those that correspond in the first peræopods, to which it is in general similar.

Third Peræopods.—Side-plates with the hind lobe rather broader and longer than the front. Branchial vesicles long-oval as in the preceding pairs, but shorter. The marsupial plates in the specimen figured were short and narrow, with a few long setæ round the apex and part of the front margin. The first joint not so broad as the side-plate, slightly longer than broad, the breadth almost uniform, the hinder surface hairy, the front margin fringed with setæ, especially below, with one spine at the apex; the second joint overlapped by the first behind; the third joint short but broad, widening distally, with one apical spine behind, in front four groups; the fourth joint short, broad, squared, a little narrowed distally, with two groups of spines behind, and three in front, the apical groups almost encircling the joint; the fifth joint narrow, straight, shorter than the fourth, with two groups of spines in front and one behind; the finger narrow, acute, as long as the preceding joint.

Fourth Peræopods.—The side-plates and branchial vesicles small. The first joint, like most of the limb, larger than in the preceding pair, the hind margin concave, ciliated, the front a little sinuous but chiefly convex, armed with numerous groups of long setæ as well as with spines, behind broadly overlapping the second joint, which in front carries two groups of spines; the third joint armed as in the preceding limbs, but much larger, greatly expanded below, the front margin straight, the hinder much curved; the fourth joint not much longer than its width at the base, with two groups of spines on the straight front margin, and one at the apex of the hinder one; the fifth and sixth joints as in the preceding pair.

Fifth Peræopods.—The first joint greatly dilated, especially below, so that the three following joints turned backwards do not reach the serrate hinder border; the front border is convex, with some small setæ and spines, at the apex a large and a small spine; the interior of this broad joint is largely occupied with packets of gland-cells

in several rows, giving a darkened appearance to the centre part in spirit-preserved specimens; the second and third joints each have a long and a short spine at the apex in front, the third joint is broader and a little longer than the fourth, and has a spine on the apex behind; the fourth joint, a little longer and broader than the fifth, has two groups of spines in front and an apical group behind, the hind margin tending to concave; the fifth joint has the hind margin straight, forming a small finely fringed cap over the base of the finger, and has two seta-like spines at this apex, and spines at two points of the front margin; the finger is almost straight, slender, with some fine pectination on two edges.

The descriptions of the peræopods apply to the specimen figured, a female; in the other specimen which has been alluded to, these limbs showed in many parts a diminished breadth in comparison with the length.

Pleopods.—Peduncles short, not longer than broad; the pair of coupling spines slightly sinuous, tapering, apically hooked, with five minute serratures on the margin below the hook; with these spines there is a plumose seta; the outer rami with eight to ten joints, the inner with six or seven, the first joint not very long, and carrying two cleft spines on its upper part.

Uropods.—Peduncles of the first pair rather longer than the rami, with a strong apical spine, besides two or three marginal spines and a row of marginal spinules; the rami stiliform, subequal, that which is rather the longer having one marginal spine; the second pair reaching little beyond the peduncles of the first, the peduncles armed with two or three spines, not longer than the slender, smooth, subequal rami; the third pair reaching much beyond the second, the peduncles shorter than the outer ramus, darkened by a large packet of gland-cells, apically bordered with spinules; the outer ramus as if two-jointed, the nail apart from its apical seta being as long as the stem, which has spines on either side of the base of the nail, the inner branch rather resembling a broad tapering spine, not reaching the base of the nail of the outer branch, carrying a small cilium near the top.

Telson reaching a little beyond the peduncles of the third uropods, rather longer than the breadth at the base, cleft nearly to the root, the halves not in the least dehiscent, unless a little near the sharp apices; each half has a pair of cilia on the outer margin near the apex, another a little higher up, and a single cilium on the surface high up.

Length.—The specimen figured measured, in its bent position, less than three-twentieths of an inch.

Locality.—Off Cumberland Bay, Kerguelen; from a depth of 120 fathoms. Five specimens.

Remarks.—The specific name is derived from the Greek word λαχνήεσσα, woolly, shaggy, and refers to the hairiness of the integument. The rostral prolongation of the

head in this species favours the view taken by Gerstaecker in placing the genus among the Phoxina, Sp. Bate (see p. 582).

Genus *Platyischnopus*, n. gen.

Mandibles with denticulate molar tubercle, third joint of the slender palp elongate.

First Maxillæ with one-jointed palp, apical spines of the outer plate almost smooth.

Second Maxillæ with the plates broad, especially the outer.

Maxillipeds with the outer plate reaching beyond the second joint of the palp, and having long teeth on the inner margin.

Both pairs of *Gnathopods* long and slender, with the first, second, and fourth joints long, and the hands chelate.

The Fourth and *Fifth Peræopods* with the third and fourth joints of great breadth, and carrying numerous spines.

The Telson emarginate.

The head long, irregularly-shaped, produced over both pairs of antennæ to a rostral tip; none of the side-plates deep.

The generic name is derived from the Greek words, πλατύς, broad, ἰσχνός, narrow, πούς, a foot, and refers to the union in the animal of very narrow with very broad feet.

The general structure brings the genus into alliance with the subfamily Phoxinæ, Spence Bate, as defined by Boeck, while the peræopods show a relationship to those of *Urothoë* and *Haustorius* (*Lepidactylis*), so that it may stand for the present in the family Pontoporeiidæ, although the combined characters of its peculiar head, the chelate gnathopods, and the emarginate telson, give it a more or less isolated position among the Amphipoda at present known.

Platyischnopus mirabilis, n. sp. (Pl. LVIII.).

Head long and remarkable, the short rostral peak in our specimen puckered perhaps accidentally, behind this the head widens rather abruptly, and continuing to widen forms a tract included in the back of which are the first joints of the peduncles of the upper or front antennæ; close behind these the head becomes quite abruptly shallower and then again deepens gradually to the base, the eyes occupying the shallow part between the places of insertion of the upper and lower antennæ; the dorsal line of the head is nearly straight, longer than the first three segments of the peræon united; of the peræon-segments the sixth and seventh are the longest, and the seventh has the postero-lateral angles acutely produced to a small extent; of the pleon-segments the first has the postero-lateral angles rounded, the second has these angles acute, the third acute and

upturned; the fourth has a transverse dorsal depression and a cilium near the end of the convex part which follows the depression.

Eyes small, round, dark, with about twenty-five rather long ocelli.

Upper Antennæ subequal in length to the lower, the peduncles being shorter but the flagella longer, first joint of the peduncle short, embedded in the head; the second much longer than the first or third, with some deep serrations on the lower margin, and various groups of strong spines on the surface and margins; the third joint not much longer than the first of the flagellum, with one large group of spines near the base; the flagellum of six joints, of which the first is the longest; the secondary flagellum of three, of which the first is nearly as long as the first of the primary, but more slender, the third is minute.

Lower Antennæ.—These are separated by a wide interval from the upper antennæ, and in the natural position of the head may be described rather as being set behind than below the other pair; the basal part of the first and second joints somewhat expanded, the gland-cone small but distinct; the third small, scarcely reaching beyond the gland-cone at its side, the fourth and fifth long, armed on the margins with spines and long setæ, the fifth joint shorter than the fourth, but longer than the slender three-jointed flagellum, which is outstripped by the apical setæ of the fifth joint.

Upper Lip.—Distal margin rounded, but with the centre flattened and a little roughened with projecting points.

Mandibles.—Cutting plate with a small apical margin showing one or two little denticles, seemingly folded over a small secondary plate, the part of the mandible in front of the palp and molar tubercle forming a long bent tongue or tooth, without, so far as could be perceived, any spine-row; molar tubercle prominent, with small denticles; the slender palp set just over the molar tubercle, the first joint short, the second curved, with the front margin convex, the third straight, nearly as long as the second, tipped with four or five short setæ. Whether a secondary plate belongs to either, both, or neither of the mandibles I have not been able to determine.

Lower Lip of delicate structure, principal lobes broadly rounded, little dehiscent.

First Maxillæ.—Inner plates small, slender, not very distinctly made out; outer plates broad, with eight or nine spines on the apical border, the innermost straight, pointing away from the rest, the remainder more or less curved, some with a single lateral tooth, the outermost simple, broad-tipped; the palp one-jointed, slender, not reaching so far as the outer plate, tipped with three setæ, two of which are long, reaching beyond the spines of the outer plate.

Second Maxillæ.—The inner plate broad at the base, round the apical and upper part of the inner margin carrying several setæ; the outer plate very much broader than the inner, the broad oblique apical margin carrying numerous setæ or seta-like spines; there is a single cilium near the apex on the convex outer margin.

Maxillipeds.—Inner plates reaching nearly to the apex of the first joint of the palp, the apical border sloping back towards the outer, and occupied by five long plumose setæ; the inner plates long and narrow, reaching slightly beyond the second joint of the palp, having on the straight inner margin five setæ, followed by nine rather long spine-teeth in a series which does not quite reach the apex; there is also on the surface a row of eight setæ beginning a little lower than the row of spine-teeth; the first joint of the palp is short, the second much longer, its inner margin bordered with long setæ except close to the base and for a space distally; the third joint longer than the first, with setæ or spines only on the apical part; the finger short, with a long slender nail accompanied by some cilia.

First Gnathopods.—Side-plates very small, directed forwards. The narrow first joint extending much beyond the side-plate, with some long setæ at a few points on each margin, the lower half of the joint a little expanded; the second joint narrow, longer than the third, as long as the hand; the third joint not long, bent, the hind margin being much longer than the front, and carrying a single cilium near the apex; the wrist long and slender, but not equal in length to the two preceding joints united, with a group of setæ near the apex behind; the hand with the closed finger forming a long oval, the front margin of the hand being much shorter than the hinder, the extremities of the two being joined by a very oblique palm, in antagonism with which the finger and nail form a complete chela, capable of gaping widely; at the apex of the front margin there is a group of setæ, some of which are longer than the finger; there are two groups of setæ on the hind margin not far from the apex, a small spine at the apex, and setules along part of the palm-border; the finger shows some cilia about the base of the nail. The skin is extremely transparent.

Second Gnathopods.—Side-plates small, with an excavation behind, not at the top but above the middle, the first joint of the limb being attached at this point, a long seta and two cilia being set in the margin lower down. Branchial vesicles of slight structure, larger than the side-plates, tapering below. The limb constructed on the same plan as in the first gnathopod, but all the joints except the finger longer, the slender wrist being longer than the two preceding joints and as long as the first joint, the hand longer in proportion to its breadth, and with less difference between the lengths of the front and hind margins, so that the finger antagonises with a shorter palm, and is itself shorter to correspond.

First Peræopods.—Side-plates not large, with a long seta at the lower front angle. Branchial vesicles longer and larger than the side-plates; marsupial plates narrow, longer than the first joint of the limb, with half a dozen long setæ on the hinder margin and apex. First joint of the limb reaching much beyond the side-plate, with three long setæ on the lower part of its hinder margin; second joint short; third longer and broader than any of those which follow, expanded downwards, not decurrent, with setæ along much of

the hind margin, some of them very long, and a group at the apex in front; the fourth joint subequal in length to the fifth, a little expanded downwards, with spine-like setæ near the apex behind; the fifth joint similarly armed, of almost even width throughout; the finger shorter than the fifth joint, slender, tapering.

Second Peræopods.—Side-plates broad, squared, scarcely deeper than broad, the excavation behind not deep. Branchial vesicles longer than the side-plates. Marsupial plates as in the preceding pair. The first joint of the limb not quite reaching the end of the side-plate, the setæ at the end of the fourth joint exceeding the length of the fifth and sixth joints combined; the limb in general not differing from the preceding.

Third Peræopods.—The front lobe of the side-plate with the front margin flattened, the convex lower margin somewhat serrate, carrying setæ. The marsupial plates a little widened distally, there carrying four long setæ and one short one. The first joint longer than broad, widened below, the hind margin nearly straight and almost naked, the front convex, with two long setæ near the centre and two spines lower down, at the apex a seta and two long spines; the second joint short, with one spine; the third broad at the centre, decurrent behind, carrying groups of strong spines in two deep serrations of the front margin, and two of the hind margin, the apex of which is truncate, and bordered with five unequal spines attended by two small setæ, an additional group of spines being placed on the surface at the base of the decurrent part; the fourth joint is longer and narrower than the third, and carries groups of spines, one on the margin and one on the apex before and behind, many of the spines here and elsewhere being notched at the tip besides carrying an accessory thread; the fifth joint short and slender, with spines at the apex; the finger missing, evidently broken off.

Fourth Peræopods.—Side-plates broader than deep, with some setæ on the lower margin behind, this margin curving upwards to an angle. The first joint oval, with some setæ on the upper part of the front margin and spines at its apex; the hind margin smooth; the second joint small, with a spine in front; the third joint greatly expanded, so as distally to exceed the width of the first joint; it has four groups of spines and setæ on the hind margin, one on the front, and three distal groups as in the preceding pair; the fourth joint is also of great breadth, narrowing distally, carrying three groups of spines and setæ in the deep serrations of the front, and two in those of the hind margin, besides two large groups at the apex; the fifth joint is narrow, as long as the third, rather shorter than the fourth, with two sets of spines in the serrations of each margin, and two apical groups; the finger is straight, slender, tapering, more than half the length of the fifth joint, with pectinate edges. In many of the groups of spines there is one with the upper part tapering, pectinate on both edges, while others have the notched end without pectination, and some are slightly plumose.

Fifth Peræopods.—Side-plates small, the segment with its postero-lateral angle acute, carrying a cilium in a little notch below the angle. The first joint appears to be

partially coalesced with the side-plate; it is very broad, twice as broad as long, with three long setæ near the top of the front border, and a spine at its apex, the hinder border sinuous, the lower border behind also sinuous, meeting the other in a sharply outdrawn angle; the second joint short, but broader than usual, overlapped behind by the inner part of the first joint; the third joint of great breadth, distally exceeding the breadth of the first joint, with spines at six points of the hinder margin, at the top a single spine, the rest in groups; small spines at five points of the front margin; seven rows of spines along the distal border, the longest being that nearest to the front apex; the fourth joint broad, narrowing a little distally, not quite so long as the third, with two groups of spines on the hind margin, four on the front, four on the distal. The rest of the limb broken off.

Pleopods.—Some setæ on the sides of the peduncles; the coupling spines two in number, rather swollen at the base, otherwise slender, flat-topped, with one lateral hook a little way below the apical one; the cleft spines four in number on the first and second pairs, seemingly only three on the third pair; the joints of the rami numbering from twelve to fourteen; the rami not powerful.

Uropods.—Peduncles of the first pair not longer than the outer ramus, with two or three spines on the upper margin, and a long tooth at the apex of the lower; the rami slender, the outer rather longer than the inner, bordered with five spines at intervals on the upper margin, and a group of long ones at the apex by the side of a small tooth or nail; the inner ramus has three spines on the margin and the apical group; the edges are pectinate; peduncles of the second pair shorter than the outer ramus, carrying some strong spines on the edges; the outer ramus considerably longer than the inner, each with spines at two points of the margin, and a group at the apex; as in the preceding pair, the rami are nearly parallel-sided. The third uropods were unfortunately missing.

Telson small, longer than broad, narrowing slightly to the strongly emarginate termination, forming a sharp point at each side of the emargination which reaches up for not quite a quarter of the telson's length; there are four spines on each of the nearly straight lateral margins, and two long setiform spines arise on the surface just over the emargination.

Length.—The specimen, in the position figured, measured, from the rostrum to the end of the peræon, one-fifth of an inch.

Locality.—Port Jackson, Australia, from a depth of between 2 and 10 fathoms. Two specimens.

Remarks.—Unfortunately both specimens were defective; the one from which the head and peræon have been figured was without the pleon, this, as shown by the marsupial plates, being a female; the other, from which the pleon has been figured and

described, had lost the head and the third uropod; in both specimens the third and fifth pairs of peræopods were imperfect.

The specific name alludes to the bizarre configuration of the head and the odd combination of the long and slender gnathopods with the broad hinder peræopods.

Family Œdiceridæ, G. O. Sars, 1882.

In 1865 Lilljeborg established the Oedicerina as sixth subfamily of the Gammaridæ, distinguishing it from the other subfamilies as having, "Antennæ superiores flagello appendiculari carentes. Oculi compositi. Pedes trunci (thoracici) 7:mi paris antecedentibus multo longiores, segmento ultimo (ungue) longo, recto et stiliformi." To it he assigned the new genus *Oediceropsis*, together with *Oedicerus*, Krøyer, *Monoculodes*, Stimpson, and *Kröyera*, Spence Bate. In 1870 Boeck made the Oedicerinæ the tenth subfamily of the Gammaridæ, placing in it *Oediceros*, *Acanthostepheia*, *Monoculodes*, *Halimedon*, *Pontocrates*, *Aceros*, *Halicreion*, *Oediceropsis*, *Paramphithoë*. In 1872–6 he still placed this subfamily among the Gammaridæ,[1] with the same definition as before, but excluding the genus *Paramphithoë* as having been previously enrolled by a mistake. Nevertheless *Pleustes*, Spence Bate, which Boeck here adopts in preference to *Paramphithoë*, Bruzelius, took its place as the ninth genus of the Oedicerinæ (p. 299). But later on (p. 496) Boeck explains that this was only an error passed on from the earlier to the later work. In 1882 Sars changed the subfamily into a family, with the name Oedicerida, placing in it the same genera as Boeck had done, with the exception of *Acanthostepheia*, which did not happen to be included in the Norwegian fauna. In J. S. Schneider's preliminary revision of the Norwegian Oedicerida, the same limits are adopted for the family, though Schneider suggests that a new genus should be formed for some specimens which he refers with much hesitation to *Halimedon saussurei*, Boeck. All the genera above named, with the exception of *Aceros*, are included along with several others in the subfamily Phoxina, Spence Bate, by Gerstaecker in 1886, *Halimedon* being made a synonym of *Monoculodes*, and *Acanthostepheia* of *Oedicerus*.

Boeck gave the following definition of the Oedicerinæ:—

"*Upper Lip* apically insinuate.

"*Mandibles* very robust, apically broad, more or less dentate; the accessory plate also more or less dentate; the spine-row with the spines simple but strong; the molar tubercle not very large; the palp long, three-jointed.

"The *Lower Lip* broad; the inner lobes large.

[1] On page 74 of Boeck's great work the Oedicerinæ are the fourth subfamily of the Gammaridæ, in front of the Epimerinæ; on p. 254 they follow the Epimerinæ as fifth subfamily, being numbered as "Subfamilia VI.," owing to the accidental interposition of the Iphimedinæ in front of them.

"*First Maxillæ* with the inner plate tolerably large, apically furnished with two setæ, sometimes plumose; the palp two-jointed, carrying narrow spines on the apex.

"*Second Maxillæ* with the plates very short and broad, the inner broader than the outer.

"*Maxillipeds* with the inner plates small; the outer plates sometimes longer, sometimes shorter, never very large, armed on the inner margin with strong spines increasing as they approach the apex; the palp broad and robust; its last joint strong, unguiform.

"The body little compressed. The back round, rarely carinate or armed with teeth. The side-plates of moderate size, setose on the lower margin. The first side-plate apically dilated. The head generally produced in front into a broad rostrum, on which the eyes are placed. For the rostrum to be absent and the eyes placed on the sides of the head is rare.

"*Upper Antennæ* without accessory flagelium.

"*First* and *Second Gnathopods* with the hand more or less strong, either subcheliform or cheliform; the *Second Gnathopods* rarely without a subcheliform hand; in each pair the wrist generally strongly produced into a process (calx) on the lower hinder angle.

"*Third* and *Fourth Peræopods* almost alike in size and shape.

"*Fifth Peræopods* elongate, very often twice as long as either of the two preceding pairs.

"*Uropods* elongate, biramous; the third pair with the rami narrow; the peduncle seldom elongate.

"*Telson* short, undivided."

Schneider, in his valuable review of the characteristics of the family Oediceridæ, lays especial stress on the last joint of the *Fifth Peræopods*, which is not nail-like but quite straight, cylindrical, about as long as the preceding joint, armed with spinules and sometimes with plumose setæ. He notices that owing to its extreme fragility it is often met with in a damaged condition. The inner plate of the *First Maxillæ*, he says, is large, broadly oval, apically furnished with two short setæ, of which the upper is always plumose, the lower simple, except in *Oedicerοs saginatus*, which has both plumose, and in *Aceros phyllonyx*, which has three setæ, all plumose; in some species of *Halimedon* he finds only a single simple seta. In the genus *Œdiceroides* of this Report the number of these setæ varies from three to eight. Of the *Second Maxillæ* Schneider says that in most species the two plates are of about equal breadth, in one the outer is the broader, and in two the inner, while the outer is uniformly the longer, and in all genera except *Halimedon* (to which *Œdiceroides* may now be added) there is a thicker plumose seta on the middle of the inner margin of the inner plate.

Genus *Oediceros*, Krøyer, 1842.

1842. *Oediceros*, Krøyer, Naturh. Tidsskr. R. 1, Bd. iv. p. 155.
1852. *Œdicerus*, Dana, U. S. Explor. Exped., vol. xiii. pt. ii. pp. 910, 933.
1855. „ Stimpson, Proc. Acad. Nat. Sci. Philad., vol. vii.
1859. *Oediceros*, Bruzelius, Skand. Amph. Gamm., p. 92.
1859. „ M. Sars, Oversigt over norsk-arkt. Krebsdyr.
1860. „ Boeck, Forh. ved de Skand. Naturf. 8de Møde.
1862. *Œdicerus*, Spence Bate, Brit. Mus. Catal. Amph. Crust., p. 103.
1862. *Œdiceros*, Bate and Westwood, Brit. Sess. Crust., vol. i. p. 160.
1865. „ Goës, Crust. amph. maris Spetsb., p. 10.
1865. *Oedicerus*, Lilljeborg, On the Lysianassa magellanica, p. 18.
1869. *Œdiceros*, Norman, Last Report Dredging Shetland Isles, p. 278.
1870. „ Boeck, Crust. amph. bor. et arct., p. 81.
1876. „ Boeck, De Skand. og Arkt. Amph., p. 255.
1876. *Œdicerus*, Miers, Catal. Crust. New Zealand, p. 126.
1879. „ Sars, Crust. et Pycn. nova, p. 449.
1880. „ Haswell, Proc. Linn. Soc. N.S.W., vol. iv. p. 324.
1882. „ Haswell, Catal. Australian Crust., p. 238.
1882. *Oediceros*, G. O. Sars, Oversigt af Norges Crust., p. 24.
1883. *Oedicerus*, Schneider, Norges Oedicerider, p. 11.
1884. *Oediceros*, Schneider, Crust. og Pycn. Kvaenangsfjorden, p. 78.
1885. „ Sars, Den norske Nordhavs-Expedition, p. 170.
1886. *Oedicerus*, Gerstaecker, Bronn's Klassen und Ordnungen, Bd. v. Abth. ii. p. 503.

For the original definition of this genus, see Note on Krøyer, 1842 (p. 199). J. S. Schneider, in 1883, defines it as follows :—

"Head produced into a frontal rostrum, which is sometimes geniculate, acuminate, sometimes extended forwards and obtuse; the eyes either flat or prominent, coalesced.

"*Antennæ* furnished with feathered cilia (plumulis instructæ), the flagellum of the lower antennæ of the adult male not elongated.

"*Mandibles* with the molar tubercle rather small, of irregular shape.

"*Gnathopods* with the wrist short, the hand very large, subcheliform."

Œdiceros lynceus, M. Sars (Pl. CXXXVII. B).

1859. *Oediceros lynceus*, M. Sars, Oversigt over norsk-arkt. Krebsdyr.
1859. *Oedicerus arcticus*, Danielssen, Beretning om en zool. Reise.
1860. *Oediceros lynceus*, Boeck, Forh. ved de Skand. Naturf. 8de Mode.
1862. *Œdicerus lynceus*, Spence Bate, Brit. Mus. Catal. Amph. Crust., p. 372.
1865. *Oediceros propinquus*, Goës, Crust. amph. maris Spetsb., p. 10, fig. 19.
1870. *Oediceros lynceus*, Boeck, Crust. amph. bor. et arct., p. 82.
1876. „ „ Boeck, De Skand. og Arkt. Amph., p. 259, pl. xiii. fig 4.
1883. *Oedicerus lynceus*, Schneider, Norges Oedicerider, p. 14, Tab. ii. fig. 12.
1884. *Oediceros lynceus*, Schneider, Crust. og Pycn. Kvaenangsfjorden, p. 78.

This species has not long since been carefully examined and described afresh by J. S. Schneider. He thinks it highly probable that in this species two or possibly

three years may be required for full development. "Neither Goës," he says, "nor Boeck has been successful in figuring the species; especially in the work of the latter author the head with the rostrum is quite erroneous, while it is precisely the characteristic form of this part of the body that is the best mark of distinction between *Oediceros lynceus* and *Oediceros microps*, which in many respects stand extremely near together." The figures given by Goës seem to agree with the form *microps* as to the head and the form *lynceus* as to the telson; it is possible, therefore, that Goës had a form intermediate between the other two, which are recognised both by Sars and Schneider as extremely close to one another. The mouth-organs in the Challenger specimen closely agree with the account given by Schneider in regard to *Oediceros lynceus*, but whereas he says that in the mandibles both plates are divided into six or seven tolerably acute teeth, I find on the left mandible the secondary plate divided into five rather strong teeth, and on the right mandible more weakly constructed, with numerous denticles, only the lowest of which deserves to be called a tooth. "In the first maxillæ the outer plate has two shorter furcate and five longer serrate spines; the inner plate is broadly oval with one simple and one plumose seta at the apex." Schneider calls attention to the fact that Boeck speaks of two plumose setæ. It is possible that there may be some variation between individuals in these minute details; thus, in the Challenger specimen, on one of the maxillæ one of the furcate spines has an additional tooth by the side of the shorter arm of the fork. In the lower antennæ the gland-cone is narrow and produced. On the telson, besides the two spinules at the flattened or slightly insinuate apex, there is on each lateral margin a little cilium above the rounded apical corner, and a little above this cilium a group of two or three minute cilia, none of these appendages being visible except under a tolerably high power of the microscope.

Locality.—Station 49, south of Halifax, Nova Scotia, May 20, 1873; lat. 43° 3′ N., long. 63° 39′ W.; depth, 85 fathoms; bottom, gravel, stones; bottom temperature, 35°·0. One specimen. Dredged.

Genus *Halimedon*, Boeck.

1865. *Oediceros* (*pars*), Goës, Crust. amph. maris Spetsb., p. 11.
1870. *Halimedon*, Boeck, Crust. amph. bor. et arct., p. 89.
1876. ,, Boeck, De Skand. og Arkt. Amph., p. 281.
1882. ,, Sars, Oversigt af Norges Crustaceer, p. 96.
1883. ,, Schneider, Norges Oedicerider, p. 32.
1884. ,, Schneider, Crust. og Pycn. Kvaenangsfjorden, p. 91.
1886. *Monoculodes*, Gerstaecker, Bronn's Klassen und Ordnungen, Bd. v. Abth. ii. p. 502.

For the original definition of the genus, see Note on Boeck, 1870 (p. 400). Schneider, in 1883, gives the following definition :—

"Side-plates of the third and fourth pair very large, generally almost entirely

covering the basal joint of the legs. Mandibles apically only a little dentate, the third joint of the palp straight, the molar tubercle of irregular shape, tolerably large, the molar surface not circular. Maxillipeds with the outer plate large, reaching almost to the apex of the second joint of the palp, its inner margin furnished with teeth, apically devoid of setæ. The gnathopods subequal, the second pair more or less elongate; the wrist very long, generally equalling the length of the hand or longer than the hand, produced into a short rounded heel." But as the characters ascribed to the side-plates and the maxillipeds would be unsuitable to the Challenger species which I have placed in the genus *Halimedon*, I feel bound to adhere to the definition of that genus given by Boeck, who instituted it.

Halimedon schneideri, n. sp. (Pl. LIX.).

Head about as long as the three following segments united, with a down-bent apically subacute rostrum; the lateral lobes of the head small and little produced; the back round, with a rather imbricated appearance in the specimen figured; this was perhaps accidental, as a second specimen showed but little of it, the second specimen having also the segments of the peræon more regular, the hinder a little longer than the front ones, and the seventh the longest; the first four, and especially the first three, segments of the pleon exceed in length those of the peræon; the first three have the postero-lateral angles rounded.

Eyes not made out in the specimen figured, but in the second specimen, apparently belonging to the same species, they are dark, elongate, broader in front than behind, not reaching the tip of the rostrum, closely approximate the one to the other.

Upper Antennæ.—The first joint thicker than the second, in length subequal to it, the second carrying some groups of setæ; the third much thinner and shorter than the second, also carrying some long setæ; the flagellum of seventeen joints, of which the first three or four together equal the length of the third joint of the peduncle, the first six or seven its second joint.

Lower Antennæ.—The first joint not greatly expanded, the gland-cone small but distinct, produced along part of the third joint; the third joint about equal in length and breadth, fourth joint longer and thicker than the fifth, both straight, and with numerous groups of setæ; the flagellum tapering, of twenty-four joints carrying spine-like setæ.

Upper Lip.—Both plates distally broad, the outer squared with rounded corners, and quite smooth, the inner less broad at the distal edge but with its sides sloping back across the corners of the outer plate and describing a curve beyond them, this plate also apparently unciliated. In the figures the distal edge is uppermost.

Mandibles.—Cutting plate strong, divided into three principal teeth, the centre one flanked by two denticles; the secondary plate on the left mandible strong, similar to

the principal plate but on a smaller scale, on the right mandible slighter in its structure, with three slender curved teeth clumped together; the spine-row not well made out, seemingly of five or six pectinate spines; the molar tubercle prominent, with the dentate crown not very large, some of the denticles long, the seta small; a conical process rises near the inner side of the base of the palp; the palp is fixed over the molar tubercle, the first joint not very short, the second curving outwards at the base and then backwards, the upper part being straight and thinner than the bent basal portion, its front margin bordered with spines of various lengths, some very long, a curved row also taking its origin on the surface from near the base to beyond the centre; the third joint very slightly curved, shorter and thinner than the second joint, hind margin smooth, front margin slightly serrate, bordered with small spines gradually increasing from the first to the third in each of four sets, with four long spines at the apex, and as many arising along the surface; on the right mandible this joint in our specimen was longer than on the left.

Lower Lip broad, not deep; the front lobes widely dehiscent, the inner lobes little dehiscent, rounded in front, not reaching nearly as far forward as the principal lobes; the mandibular processes apically narrowed.

First Maxillæ.—Inner plate widest a little distance from the base, the ciliated border then bending round to the curved apex and carrying two small setæ, the longer of which, at some little distance from the other, is plumose and stands near but not on the apex; the outer plate not large, though longer and broader than the inner, carrying nine slender spines on the broad, scarcely oblique, distal margin, five of the spines having but one lateral tooth, the other four denticulate near the apex; the second joint of the palp reaching much beyond the outer plate, with sixteen setiform spines extending round the upper part of the inner margin, the apex, and chief part of the outer margin; an additional row of seven or eight runs on the surface from the middle of the inner margin to the middle of the apex.

Second Maxillæ.—The inner plate broader, very little shorter than the outer, with spines on the apical and upper part of the inner margin, on the latter having also plumose setæ; cilia abundant on both margins; the outer plate carrying longer spines on the apical margin and some little way down the inner margin, and five short setæ spread along the upper half of the hinder border.

Maxillipeds.—Inner plates small, not reaching the apex of the first joint of the palp, with four setæ, not strongly plumose, on the inner margin, the rounded apex set with nine spines besides several slender setæ; the outer plates narrow, reaching beyond the middle of the second joint of the palp, the serrate inner margin being fringed with about thirty spines, the width of which is rather abruptly contracted at some distance from the apex, while the length is irregular, a long one occurring here and there among the shorter, the two near the apex being rather long and curved; to these succeed three on the apex and three on the hind margin which are setiform; the first

joint of the palp very short, the second very long, gradually expanding so that the widest part is near the distal end, the outer margin smooth, the inner thickly set with setæ or setiform spines, a few also on the surface at the upper part; the third joint longer than the first, expanding distally, the inner margin straight and unarmed, the outer margin, one surface and the apex thickly set with spines; the finger short, its inner margin straight, produced a little beyond the base of the very short nail, one or two cilia being here inserted; the dorsal cilium rather nearer the base of the finger than that of the nail.

First Gnathopods.—Side-plates narrow at the base, greatly expanded below and forwards, the lower margin convex, serrate at the corners, fringed all round with setæ of very various lengths; some spines on the hinder margin; the first joint reaching considerably beyond the side-plate, with long setæ on both margins, the second joint short, the third rhomboidal, with the distal end emarginate and the hinder apex a little produced and fringed behind with long spines; the wrist as long as the hand, becoming distally very wide, the free hind border fringed with numerous spines, of which the longest are at the slightly produced free apex; the hand long and broad, widest at the palm, the front margin longer than the hinder; the palm convex, defined by a tooth in which is set a strong spine with plumose accessory thread; there are numerous setæ of different lengths set round the palm, some groups also on the inner surface near both lateral margins and at the front apex; the finger fitting closely to the palm and when closed reaching the inside of the tooth which defines the palm; a dorsal cilium not very close to the base of the finger; a small cap over the nail.

Second Gnathopods.—The side-plates furnished like, but much narrower than, the preceding pair, not expanded, all the lower margin serrate. Marsupial plates with very long setæ. The limb very similar to the first gnathopods but more elongate, the first joint stretching far beyond the side-plate; the third joint more narrowed distally, with its hinder apex less produced than the other; the wrist and hand both longer than in the preceding pair, but not quite so wide distally, armed in the same manner, the extreme length of the wrist scarcely equalling that of the hand.

First Peræopods.—Side-plates longer and broader than those of the preceding segment. Branchial vesicles narrow at the base, widening to the distal end, longer than the side-plates. Marsupial plates narrow, rather longer than the branchiæ, with long setæ. First joint reaching beyond the side-plate, a little expanded distally in front, carrying some long setæ on its margins; third joint widening a little distally, not decurrent, with several groups of setæ on the hinder margin and an apical group in front.

Second Peræopods.—Side-plates very much broader than the preceding pair, also longer, longer than their own breadth; the angle of the hind margin is so low down as scarcely to be suggestive of an excavation; from this angle the fringe of setæ extends all round the lower margin, which bends upwards in front so as to be scarcely distinguishable

from the front margin. The branchial vesicles and marsupial plates resemble those of the preceding pair. This is also probably true of the joints of the limb, some of which in the preceding pair were damaged or missing. The first joint reaches beyond the side-plate and is rather longer than that of the first peræopods; the fourth joint shorter than the third, bordered behind with several sets of long setæ; the fifth joint not much longer than the fourth, the upper part of its hind border pectinate and carrying a few setæ, the lower part smooth; the lower front part of this joint adorned with six or seven rows of long setæ; the finger as long as the preceding joint, slightly boat-shaped; its edges smooth, tipped with a little slightly curved nail protected by a boat-shaped cap.

Third Peræopods.—Side-plates broad and deep, rather broader than deep, the front lobe the larger, both lobes partially fringed with setæ; the branchial vesicle narrowed below. The marsupial plates short. The first joint of the limb much narrower and also shorter than the side-plate; the wing more expanded above than below, both margins fringed with setæ, some very long and densely plumose, some setæ also on the inner surface; the third joint widening a little distally, not decurrent, beset with numerous groups of setæ, those on the hind margin long; the fourth joint shorter than the third or fifth; the fifth joint similar to that in the second peræopods, so also the finger, but somewhat shorter.

Fourth Peræopods.—Side-plates deeper than broad, the lower margin fringed with setæ behind. The branchial vesicles bent not far from the base, and thence narrowing downwards. The limb similar in structure and furnishing to those of the preceding pair, but all the joints except the second longer; the fourth joint has distally a little oval-ended process overlapping the following joint behind in one member of the pair of limbs, whether broken off in the other member of this and in the other pairs of peræopods I cannot say; while the finger in the third pair is much shorter than the preceding joint, it is in this pair fully as long.

Fifth Peræopods.—Side-plates much broader than deep, lower margin fringed with short setæ. In the Plate the side-plate and the hinder corner of the segment above it are figured with the lettering *prp.* 5., but in fact the peræopods themselves were missing. In this figure the hairy nature of the integument is indicated. In the second (much smaller) specimen alluded to above, the first three joints of the fifth peræopod are preserved, the first is very much broader than the corresponding joint in the preceding limb, somewhat ovate, with the upper part much broader than the lower; the front margin longer than the hinder; the third joint narrower below than above, very slightly produced behind.

Pleopods.—Numerous setæ upon the peduncles; the pair of coupling spines (as observed in the smaller specimen) very small and slender, with a terminal hook and one retroverted tooth with its tip upturned; the cleft spines appear to be four in number; the joints of the rami numbered ten to twelve in the small specimen, but seemed to be rather more numerous in the larger.

Uropods.—The peduncles of the first pair longer than the rami, with many small spines on two edges; the rami slender, one longer than the other, the tips curved, the rows of small marginal spines ceasing some way from the tips; the peduncles of the second pair a little longer than the rami; the rami equal, slender, straight; the peduncles of the third pair about equal to the rami, reaching as far back as the peduncles of the second pair, the rami subequal, acute, reaching almost as far back as the rami of the second pair; it should be noticed that in the specimen figured the third uropods are very unequal, one member of the pair having a peduncle much shorter, and the single ramus present also much shorter, than the corresponding pieces of the other member.

Telson short, very far from reaching the end of the peduncles of the third uropods, longer than broad, narrowing a little distally, the distal border scarcely emarginate, furnished with a couple of cilia and perhaps one or two more.

Length.—The specimen, in the position figured, without the antennæ, was rather more than half an inch long. The second specimen was about one-third the length of the first.

Locality.—Kerguelen Island. The larger specimen was only labelled as coming from Kerguelen; the smaller as taken at the surface in Betsy Cove, Kerguelen, on January 10, 1874.

Remarks.—The specific name is given in honour of J. Sparre Schneider, who is doing so much excellent work both among the Amphipoda and other objects of natural history, and to whom I personally am much indebted for many valuable specimens.

The species agrees well with Boeck's definition of his genus *Halimedon*, in which I have therefore placed it, although the upper lip does not appear to be *in apice insinuatum*, nor do the spines of the mandibular spine-row appear to be simple, as required by the characters which Boeck assigns to the subfamily Oedicerinæ.

Genus *Œdiceroides*, n. gen.

Head produced into a rostrum on which the elongate eyes (when present) are placed. Upper antennæ much shorter than the lower, fourth and fifth joints of the lower antennæ elongate.

Mandibles with strong molar tubercle, the second joint of the palp large, broader at the base than distally.

The First Maxillæ with from three to eight plumose setæ on the inner plate and setæ on the outer margin of the palp.

The Second Maxillæ with the inner plate broader than the outer, both broad.

The Maxillipeds as in *Œdiceros*, the outer plates reaching about halfway along the broad and long second joint of the palp.

The First and *Second Gnathopods* with large hands and with large distally expanded wrists.

The Fourth Peræopods longer than the third, though similar in structure.

The Fifth Peræopods much longer than, but not nearly double the length of, the fourth.

The generic name refers to the great likeness between this genus and *Œdiceros* of Kroyer; but, not to speak of smaller differences in the mouth-organs and in proportions of the peræopods, those in the gnathopods were too great to admit of the inclusion of the new species in the older genus, without modifying the definitions of it given by Boeck and by Schneider, which did not seem to be desirable.

Œdiceroides rostrata, Stebbing (*Œdiceroides conspicua*, Pls. LX., LXI.).

1883. *Œdiceropsis rostrata*, Stebbing, Ann. and Mag. Nat. Hist., ser. 5, vol. xi. p. 204.

The rostrum long and somewhat arched, projecting well beyond the first, if not the second, joint of the upper antennæ, dorsally, laterally, and inferiorly carinate, the dorsal carina, however, not like the other three running out to the little boat-shaped apex, but descending rather abruptly into it; the sides of the head are produced in large squarish lobes, angled above and rounded below; on either side the base of the rostrum and behind it there is a depression, and another crossing the head near its hind margin. The peræon is stout, with rounded back, each of the first six segments having a transverse dorsal depression; the seventh, which is the longest, has a small median tubercle. The pleon is compressed, each of its first four segments carrying a median tubercle of successively greater length, forming a sort of carina, interrupted by a dorsal depression in the fourth segment. The fifth and sixth pleon-segments are very short. The side-plates of the peræon-segments and the lower margins of the first three pleon-segments are, as usual in this family, fringed with setæ. The whole animal appears to be covered with short down.

Eyes wanting; see Note on Willemoes Suhm, 1876 (p. 461). The "finely granulated red pigment," of which Willemoes Suhm makes mention, occupies all the thickened part of the rostrum, not descending into the boat-shaped apex; in the specimens preserved in spirits the proboscis and its granular contents were no longer bright red, but white like the rest of the animal. It will be noticed that in the other two species assigned to this genus eyes are present on the rostral prominence.

Upper Antennæ not nearly reaching the end of the peduncle of the lower, the first joint broadest at the base, as long as the two following joints united, carrying many cilia and fine setæ; the second joint nearly twice as long as the third, both furnished like the first; flagellum of twenty-one joints, of which the upper, to the number of about twelve, are thick, the remainder thin and longer, these latter having each a distal group of cilia, while the thicker joints, at least in one specimen, might be described as bearded.

Lower Antennæ much stouter and longer than the upper; a small gland-cone on the second joint just below the slightly expanded portion of the first joint; the third joint about equal in length to the coalesced first and second, carrying numerous setæ; the fourth joint longer than the preceding three united, not much shorter than the flagellum of the upper antennæ, with two very long spines on the side, one below the centre, the other almost distal, also a short spine on the upper margin near the distal end, and all along this margin spinules or setules which like the spines are hairy; the fifth joint as long as the first three united, armed with some large spines, two of them very long, and with numerous setules and long feathered cilia; the flagellum of about sixty-five joints, thick at its base and tapering slowly, in every joint except the first two or three and the last dozen showing a small calceolus standing stiffly out on the upper distal end; the above description applies to the specimen figured on Pl. LX.; in another specimen the long spines are altogether absent, the fifth joint is only very little shorter than the fourth, both are fringed all along beside the upper margin with small rows of setules scarcely projecting beyond the edge; the flagellum, not as in the other specimen shorter, but longer than the peduncle, slender throughout, of seventy-four joints, armed only with short cilia; to this specimen, a very large one, belonged the upper antennæ with the bearded flagella.

Upper Lip very broad, the rounded distal margin projecting at the centre in a little point, the central space almost naked, but the tracts on either side of it strongly furred.

Mandibles.—Cutting plate with two or three large teeth at one end and a small tooth at the other, the intermediate space smooth or slightly denticulate; the secondary plate in the left mandible with its edge divided into six strong teeth, in the right mandible of much slighter structure with the edge divided into four slender teeth; the spine-row of six, seven, or eight slender, hairy, or denticulate spines; the molar tubercle large and prominent, with a small hairy tubercle at the upper corner in front, one side of the more or less oval crown smooth-edged, the other finely dentate, the appearance varying considerably according as the smooth or the dentate edge is shown outermost; a conical process stands between the molar tubercle and the palp. The first joint of the palp short, the second long, stouter at the base than above, its hinder margin concave, some long thin setæ on the lower part of the front margin, along which are spines of various lengths; the third joint is not shorter than the second, bordered with short spines along more than the upper two-thirds of the front margin, with long spines at the apex, and a long spine near the base behind, or with two such spines.

Lower Lip broad; the principal lobes broad, the forward margins broad, slightly curved, densely furred; the inner margins with their anterior portions nearly straight, standing widely apart, the interval being partly filled by the front margins of the inner lobes; the mandibular processes bluntly pointed.

First Maxillæ.—Inner plate broader than the outer, its length scarcely greater than its breadth, carrying eight plumose setæ, which commence not at, but close to, the apex, pass along the straight, slightly oblique distal margin, and along the curve which joins it to the convex inner margin; the outer margin is nearly straight; the outer plate narrows distally, and carries on the truncate distal edge nine spines, most of them furcate, in the sense of having only one lateral tooth; the innermost has three lateral denticles, the one next to it is truly furcate, the lateral tooth being nearly as long as the main branch and parallel to it; the first joint of the palp has some setæ at points of its outer margin, the second joint, which is widest about the centre and overtops the outer plate, has setæ at three points of the somewhat serrate outer margin, and round the apex and part of the inner margin has two rows of bristles, twenty-one in all, most of them looking like slender setæ, three at the apex being definitely spiniform, two of them delicately pectinate on two edges, the third with a tendency to be so.

Second Maxillæ.—Both plates broad, especially the inner, which is broader and very little shorter than the outer; both are densely ciliated, the spines of the inner commencing near the inner end of the broad distal margin, and passing far down the inner margin, accompanied on this by plumose setæ, some of which fringe it almost to the base; on the outer plate some short spines are placed on the distal border a little way from its outer corner, and followed by a fringe of long, though slender, spines, which pass about halfway down the inner margin.

Maxillipeds.—The inner plates small, broad in proportion to their length, not reaching nearly so far as the distal end of the first joint of the palp, the distal margin set with several short, distally serrate spines; the outer plates crescent-like, reaching about to the middle of the second joint of the palp, set along the inner margin with numerous seta-like spines, which increase in length towards the apex, passing round the apex and part of the outer margin as long plumose setæ; the first joint of the palp short, with some setæ on the apex, the second joint long and large, bordered on the inner margin with long seta-like spines, longest at the broadest part of the plate which precedes the apex, with a row also on the inner surface; the third joint longer than the first, widening distally, set on the inner surface with some six rows of spines, several of which are longer than the finger, plumose at the centre, distally pectinate; the finger curved, shorter than the third joint, much thicker at the base than at the origin of the little crooked nail; the small dorsal cilium at not quite a third of the distance between the base of the finger and the base of the nail.

First Gnathopods.—The side-plates projected forwards below the head with a straight front margin, the lower half carrying setæ, the lower margin bent abruptly upwards to meet the hind margin, which also carries setæ at intervals. The first joint scarcely reaching beyond the side-plate, with some long setæ on the margins and inner surface, and groups of spines on the distal part of the inner surface, most of these spines, and

those on the three following joints, having abruptly contracted pectinate terminations; the second joint with a distal group of spines at the back; the third joint not greatly longer than the second, with a group of spines round the curve which unites the lower and hinder margins, and another group on the inner surface within the lower front apex, which apex rests against the outside of the wrist; the wrist distally broad, the wing carrying spines on its inner surface and bordered with them, its expansion forming a cup for the hand, it being also slightly produced so as to form a calx, the effect of which is increased by the apparent tendency of the hand to bend towards it; the hand large, oval, longer than the wrist, all the hind margin, except the short piece which the wrist can overlap, being defined as a convex palm densely ciliated and fringed with setules; on the inner surface there are some rows of long pectinate setæ reaching to the front margin; the teeth in many standing at a right angle to the length of the seta; there are also smaller groups near the palm; the long curved finger when closed fits the palm border, reaching the small palmar spine; the dorsal cilium very small, near the base.

Second Gnathopods.—Side-plates with front and hind margins nearly parallel, fringed, though less densely than the lower margin, lower margin rounded, chiefly at the corners. Branchial vesicles large, irregularly folded, seemingly of very thin texture. First joint reaching much beyond the side-plate, carrying long setæ on the margins, this and the remaining joints closely resembling the corresponding joints of the first gnathopods in shape and armature, but exceeding them in length; the third joint rather more squared at the hinder distal angle, the wrist with its wing slightly more produced, the hand considerably longer but only slightly wider, the finger not quite reaching the two small palmar spines; the inner side of each gnathopod is represented in the Plate, from which it will appear that the hand of the second gnathopod is devoid of the long pectinate setæ which adorn the hand of the first.

First Peræopods.—Side-plates rather longer and broader than the preceding pair, otherwise similar. Branchial vesicles in this and the following pair very extensive and lightly crumpled. The first joint not reaching beyond the side-plate, fringed on both margins with long and short setæ, some of them plumose; the second joint short; the third not decurrent, with spines singly or in groups along the straight hind margin, and one group at the front apex; the fourth joint narrower and a little shorter, with numerous groups of spines, some of them large and long, fringing the hind margin, and a group of setæ at the front apex; the fifth joint as long as the third, armed at eight points on each margin, the name of spines being suitable to the furniture of the straight hind margin, of setæ to that of the slightly convex and serrate front margin; the finger a little shorter than either the fifth or fourth joint, slightly boat-shaped, tapering to a very small nail with a narrow cap projecting beyond it.

Second Peræopods.—Side-plates scarcely longer than those of the preceding pair, rather deeply excavate behind, the plate being widest at the lower angle of the

excavation, from which the margin runs obliquely forward, closely fringed with setæ and continuous with the convex lower margin. The limb similar to that of the first peræopods.

Third Peræopods.—The side-plates broad, with the two lobes almost equal. The branchial vesicles seemingly not quite so large as those of the preceding pair. The first joint broadest above, nearly once and a half as long as broad, with numerous setæ arising both on the surface and round the front and hind margins, many of them very long and densely plumose; the second joint short; the third fully as long as the first, with the front margin nearly straight, the hinder convex, not decurrent, both densely fringed with spines and long plumose setæ; the remaining joints similar to those of the next pair, but shorter.

Fourth Peræopods.—The side-plates with the lobe behind much deeper than the front margin. The first joint somewhat longer and broader than in the preceding pair, the hind margin sinuous, making the joint more pear-shaped, the armature similar; the third joint longer than the first, apparently more spiny on the hind, and less setose on the front margin than in the third peræopods, but the difference may be accidental, since long plumose setæ are easily broken off; the fourth joint about half the length of the third, and much narrower, with small groups of spines at six points of the front margin, and an apical group of setæ behind; the fifth joint longer than the fourth, but narrower, with spines at seven points along the front margin, and setæ at a dozen along the slightly convex hind border; the boat-shaped tapering finger as long as the fifth joint; the minute nail in one specimen was upturned, as represented in the figure (Pl. LXI.), from which it may be presumed that these nails are movable, though they are rarely seen except in line with the finger.

Fifth Peræopods.—The side-plates broad and shallow, the hinder part a little deeper than the front, fringed along much of the lower and all of the hinder margin. The first joint broadly pear-shaped, much longer and wider than in the preceding peræopods, the front margin much longer than the hinder, very convex above, much straighter below, fringed with spinules, and on the lower part with small setæ, the sinuous hind margin closely set with setæ; the second joint fringed on the straight front margin with setæ; the third joint almost as long as the first, straight, parallel-sided, a very little decurrent behind, with thirteen groups of spines along the front margin, and many interspersed with setæ along the hind margin, which, like the front, has a strong group of spines at the apex; the fourth joint almost as long as the third, straight, apically a little widened, fringed in front with spines, behind with two principal groups, one apical, the other distant about one-third of the length of the joint from the apex; the fifth joint as long as the third or nearly so, slender, straight, crowded with short spines in groups about the front margin, several spines along the hind margin, and along the inner surface (not therefore shown in the figure), some thirteen groups of spines of various lengths, five or six being

very long; the finger about as long as the preceding joint, straight, slender, tapering, serrate on both edges, and provided all along with slender spines or setæ. This limb is very much longer than that which precedes it, but not nearly double its length, since it is only in the fourth joint that it attains that superiority, while in the third joint it is but a trifle longer.

Pleopods.—The coupling spines show on one side two lateral retroverted teeth besides that at the apex, and several denticles along the other side; the cleft spines are eight in number, at least on the first and second pairs, the arms very short and nearly equal, one as usual having the form which I have called spoon-shaped, but which might better be likened to the hand of a clock, the other conspicuously denticulate; the first joint of the outer ramus has a conspicuous interlocking process at the base; the joints of the rami number from twenty-six to thirty, those near to the large first joint being very short and broad.

Uropods.—The peduncles of the three pairs reaching back almost to the same point, with the variation in length which this demands, their edges and those of the rami fringed with very numerous spines, the rami of the first pair longer than those of the second, and the second longer than the third, in each pair subequal, lanceolate, the inner margins of the outer and the outer margins of the inner rami being finely pectinate, the apices tapering rather abruptly.

Telson small, nearly square, but with the lateral margins a little convex and the distal a little emarginate, all three more or less ciliated.

Length.—The specimen measured three-quarters of an inch from the tip of the rostrum to the end of the first uropods in the position figured; the largest specimen was an inch and a quarter long.

Localities.—Station 149H, Cumberland Bay, Kerguelen Island; depth, 127 fathoms; bottom, volcanic mud. Five specimens.

Station 150, off Heard Island, February 2, 1874; depth, 150 fathoms; bottom, coarse gravel; bottom temperature, 35°·2. One specimen.

Remarks.—Originally I placed this species in the genus *Oediceropsis*, Lilljeborg, and named it *Œdiceropsis rostrata*, to emphasize its possession of a large rostrum as distinguished from *Oediceropsis brevicornis*, Lilljeborg, to which in some respects it bore a great resemblance. Subsequently I found that in this and two other new species the inner plate of the first maxillæ was large, not small as in *Oediceropsis*, nor was the inner plate of the second maxillæ *much* wider than the outer, as in *Oediceropsis*. Moreover, the last-named genus was specially instituted for a species without a rostrum, and with lateral eyes, in these respects differing from all the three new species in question. For these, therefore, I thought it expedient to institute the new genus *Œdiceroides*. But in a genus in which every species has a rostrum, the name *rostrata* was not very suitable for any one species. For this reason it seemed advisable to change the name of the

species to *Œdiceroides conspicua*, as it stands on Pls. LX. and LXI., but I have since reflected that the name *rostrata* has no such inherent depravity as to justify a change, and I suppose that, apart from such defect, the author of a specific name has no more right over it, when once published, than any one else. The name *Œdiceroides conspicua*, being thus strangled before its birth, will, I hope, not swell the future lists of synonyms.

Œdiceroides cinderella, n. sp. (Pls. LXII., LXIII.).

The Head as long as the first three segments of the peræon, the rostrum dorsally, inferiorly, and laterally carinate, somewhat depressed, reaching nearly as far as the distal end of the first joint of the upper antennæ, its width at the centre not half its length; the lateral lobes of the head irregularly rounded, produced over the base of the lower antennæ; back of peræon a little imbricated; first three pleon-segments with the postero-lateral angles rounded, lower margins fringed with setæ.

Eyes long, narrow, approximate, occupying most of the rostrum, and narrowing as they approach its blunt point.

Upper Antennæ.—The first joint thicker and longer than the second, the second nearly twice as long and twice as broad as the third, all carrying plumose setæ, the second having several groups, the whole peduncle not reaching nearly to the distal end of the fourth joint of the lower antennæ; of the flagellum only eight joints remained.

Lower Antennæ.—First joint not greatly expanded, gland-cone high up on the second, not decurrent by the side of the third; third joint scarcely longer than broad, carrying groups of setæ; fourth joint long and stout, carrying some setæ and feathered cilia; the fifth joint about as long but less broad, having, besides setæ and cilia, four large spines, two marginal and two apical; the flagellum of fifty-four joints, of which the first is longer than any that follow, the last alone is very slender, each with the exception of the last four carries a small calceolus, a long seta and some short ones.

Upper Lip.—The distal margin centrally smooth, the sides, which retire so as to complete almost a semicircle, are fringed with cilia almost up to the point where they bend round and narrow the lip; the inner plate entirely within the circuit of the outer, a little emarginate.

Mandibles.—The cutting plate broad, with a small tooth at one end, three large teeth at the other, and an intermediate edge which is smooth or slightly denticulate; this plate folds to some extent round the secondary plate, which in the left mandible is broad, the distal margin divided into five teeth, the lowest the longest; in the right mandible the secondary plate is of slighter construction, and in one specimen exhibited two teeth denticulate along the edges, while in the other it showed a long tooth with two denticles upon it and three smaller teeth, in the former case the plate being apparently seen end-on, and in the latter case broadside, which suffices partially, not wholly, to account for the difference;

the spine-row consists of six or seven spines, of which some at least are pectinate; the molar tubercle is prominent, with strongly dentate crown of squarish-oval shape, with forward margin more or less smooth, but in the right mandible carrying a projecting tooth above and below; between the molar tubercle and the palp is a narrow, almost conical process; the first joint of the palp short, the second as long as or longer than the first and third united, stouter at the basal than the distal portion, with spines of varying lengths along its front, the longest apical, a little curved and distally pectinate; the third joint has a long spine near the base behind, four shorter on the upper half of the front margin, and three long ones at the apex.

Lower Lip.—The principal lobes broad and shallow, widely dehiscent, the gap being to a large extent occupied by the inner lobes; the mandibular processes short and broad.

First Maxillæ.—Inner plate short and broad, bowed out on the inner side, narrowing towards the apex, and carrying three slightly plumose setæ, no one of which quite reaches the apex; the outer plate carrying nine spines on the truncate distal margin, the innermost long, with two lateral teeth, the next adjoining strongly furcate, the remainder with one or two lateral teeth; the first joint of the palp with two setæ on its hind margin, the second joint with two on the hind margin and many on the dentate oblique apical margin; in one of the specimens this palp was evidently a little abnormal on one side of the mouth, having a single seta on the outer and two on or near the inner margin.

Second Maxillæ short and broad. Inner plate broader and scarcely shorter than the outer, carrying a couple of slender plumose setæ near the centre of the inner margin, just below which commences a row of setules, short spines and setæ passing round the upper part of the outer margin to the beginning only of the broad, almost flat, distal border; the spines of the inner plate begin but a little way down the inner margin, with increased length occupy the distal border, though the longest are not outermost, and the outer slope is occupied by four shorter than any of the others.

Maxillipeds.—Inner plates not much longer than broad, not reaching the apex of the first joint of the palp, with two long plumose spines or setæ on the inner margin, and the broad slightly dentate distal margin crowded with serrate spines and spine-teeth; the outer plates reaching a little beyond the middle of the second joint of the palp, crescent-shaped, the concave serrate inner margin fringed with numerous sharp spines of increasing length towards the apex, the seven which pass round the apex and a little way down the outer margin assuming the character of plumose setæ; the first joint of the palp short, the second long and large, dilating greatly from the base distally, fringed with spines or setæ round the inner margin and carrying some on the surface; the third joint a little longer than the first, narrow at the base, with numerous spines on the outer margin, surface and apex, most of them pectinate; the finger short with the dorsal cilium near the base, and a cilium inserted where the inner margin is prolonged at the base of

the nail. As shown in the figure *mxp.*, Pl. LXII., in one specimen these maxillipeds were not symmetrical.

The *triturating organs* show an inner row of short sharp teeth, broad at the base and apparently simple, while the outer row consists of long slender spines covered with prickles or denticles.

First Gnathopods.—Side-plates greatly expanded below and outdrawn in front, with cilia along the front margin, plumose setæ fringing the lower, scattered on the inner surface, and occurring at intervals on the hind margin. The first joint broad, rather bent, reaching beyond the side-plate, with groups of spines near and at the distal end; the second joint with a group of spines at the hinder apex; the third joint short, squarish, with no free front margin, the lower hinder corner rounded and set with a group of spines; the wrist broader than long, the hind wing, which gives it something of a cup-shape, being set both round the crenulate edge and on the inner surface with numerous spines, which, like many of those on the preceding joints, are plumose in the middle, then become finely pectinate and end seta-like; the hand is large, longer than the wrist, from a rather narrow base expanding greatly, with four groups of setæ or spines near the long convex front margin; the hind margin is smooth, short, the difference in length between this and the other margin being made up by the great length of the convex palm, defined by a curved spine, and fringed with closely set cilia, numerous setæ and setules taking their origin on each surface along the palm-border, while others arise on the inner surface at some distance from it; the finger is of great length, slender, curving round the palm, the defining spine of which it a little overlaps, being itself smooth except for some microscopic cilia within its inner margin and the dorsal cilium near its base.

Second Gnathopods.—Side-plates of nearly even breadth throughout, the convex lower margin fringed with numerous plumose setæ. Branchial vesicles as long as the first joint of the limb, with a small accessory lobe close to the narrow neck. The limb in shape and details closely resembling the first gnathopods, but of greater length; the first joint extending much beyond the side-plate, the spines near the front apex strong; the third joint with strong spines extending less round the hinder and more round the distal margin than in the first gnathopods; the wrist of equal length and breadth, larger than that of the preceding pair, the hand longer, without being broader, than in the preceding pair.

First Peræopods.—Side-plates as in the preceding segment, but rather broader. Branchial vesicles distally broader than those of the second gnathopods, with a small oval accessory lobe near the neck. First joint reaching beyond the side-plate, with some setæ on the margins; second joint short; third joint longer than the fourth, not decurrent, with three or four groups of setæ on the hind margin, the apical groups long, and an apical group in front; the fourth joint like the preceding, narrowest at the base, subequal in length to the fifth, with an apical group of setæ in front, and on the hind margin four

curved spines, three accompanied with setæ, the apical spine the longest; the fifth joint a little curved, with small incurved spines at three or four points on the hind and setæ at six points on the front margin, some of the latter being very long; also at the juncture with the finger behind, two very small spines curving outwards; the finger shorter than the fifth joint, somewhat boat-shaped, with smooth margins, an oval boat-shaped cap projecting over and beyond the tip of the small nail.

Second Peræopods.—Side-plates very broad, somewhat deeper than broad, a little broader below than above, fringed round the lower margin with plumose setæ of various lengths. The branchial vesicles similar to those of the preceding pair, longer than the first joint of the limb. The limb very similar to that of the first peræopods; the first joint reaching below the side-plate, with some long plumose setæ on the upper part of the hind margin; the third joint with an apical group of setæ on the front, and two or three groups on the hind margin, this and the two following joints being rather shorter, while the finger is rather longer, than in the first peræopods; the fourth joint with an apical group of setæ in front, and on the hind margin three long curved spines, each attended by setæ; the fifth joint has setæ at five points on the front margin, incurved spines at three on the hind margin, and the apical pair of outcurved spines.

Third Peræopods.—Side-plates broad and large, much broader than deep, with setæ on the lower margin, the front lobe larger than the hinder. The branchial vesicles somewhat larger than the first joint of the limb, with a small accessory lobe at the base. The first joint tending to an oval, rather broader above than below, with setæ along the hind margin, rather to be called prickly than plumose (which may also be said of those on the various side-plates), also with setæ on and near the front margin, and some that are very long and plumose on the inner surface; the third joint broad, not much shorter than the first joint, and nearly as long as the fourth and fifth united, fringed with long spines or spine-like setæ along both margins; fourth joint rather shorter than the fifth, with some small groups of short and long spines in front, and an apical group behind; the fifth joint with two slender spines and a spinule on its straight front margin and four spinules on the slightly curved hind margin; the finger longer than the fifth joint, with a slight constriction near the base, in which is inserted, not a cilium, but a seta; the usual cap over the short nail.

Fourth Peræopods.—Side-plates lobed behind, with the lower margin serrate and fringed. The first joint about equal in length to that in the third pair, broadest above, with numerous setæ along the front and hind margins, some long and densely plumose (which are easily broken off) arising on the inner surface; the third joint longer than the first, its margins fringed with numerous setæ, some spine-like, some plumose; the fourth, fifth, and six joints similar to those of the preceding pair, but in each case longer; the fifth joint with three slender spines and a spinule on its front margin, in addition to the little hinge-spines; the seta at the base of the finger not observed, probably broken off.

Fifth Peræopods.—The side-plates shallow, not narrowed behind, serrate and fringed round the lower and hind margins. Branchial vesicles small, apparently with a small accessory lobe at the base as in the other pairs. First joint much longer and broader than in the preceding pairs, about once and a half as long and more than once and a half as broad, with short spines along most of the very convex front rim, setæ along the shorter, also convex hind rim; the second joint short, all the others elongate, of nearly equal length, none so long as the first joint, all bordered with spines of various lengths and thicknesses, some of which are prickly, many with short bent tips and a small accessory thread, those on the slightly serrate margins of the finger being slender, prickly, not decreasing in length as they approach the tip of the finger, the tip itself broken. This limb, though very much longer than the fourth peræopod, cannot be considered nearly double as long.

Pleopods.—The coupling spines on the third pair being seen full face showed two lateral retroverted hooks on each side, one of them having a third on one of its sides and an appearance near the base of two little upturned points; those on the first pair, less well placed for observation, appeared to have more hooks, and more on one side than the other; the cleft spines showed a row of five on the first pleopods, of four on each of the following pairs; the interior roughening of the longer arm was in this species very conspicuous. The joints of the rami numbered from fifteen or sixteen to eighteen. On the peduncles there were plumose setæ and some spines.

Uropods.—Peduncles of the first pair considerably longer than the rami; the rami acute, with small spines on the upper margins, not extending to the apex, one ramus longer than the other; peduncles of the second pair longer than the inner ramus; the outer ramus broken, the inner reaching back between the longer and the shorter ramus of the first pair; the third uropods broken off.

Telson short, not reaching far beyond the produced sides of the sixth pleon-segment, rather longer than broad, the broad distal margin with a slight tendency to crenulation, set about with plumose cilia and having a small spine on either side of the almost angled centre.

Length.—The specimen figured life-size on Pl. LXIII. fig. A., measured three-fifths of an inch, exclusive of the antennæ.

Locality.—Station 317, near the Falkland Islands, February 8, 1876; lat. 48° 37′ S., long. 55° 17′ W.; depth, 1035 fathoms; bottom, hard ground (gravel); bottom temperature, 35°·7. Two specimens. The more complete specimen was mounted on board the vessel, and labelled as obtained "from net at the weight."

Remark.—The specific name refers to the glassy slipper-like cap over the nail in the peræopods which is found in this species, and indeed in many others of the same family.

Œdiceroides ornata (Stebbing) (Pl. LXIV.).

1883. *Acanthostepheia ornata*, Stebbing, Ann. and Mag. Nat. Hist., ser. 5, vol. xi. p. 203.

Two antero-dorsal ridges on the head lead to the neck of the very pronounced rostrum, which is dorsally, inferiorly, and laterally carinated, the top convex, the sides converging to a point reaching beyond the first joint of the upper antennæ, the lower carina produced to a point a little less advanced than the upper one; the whole surface except the neck, the carinæ, and the extreme tips being occupied by the eyes; a small rounded lobe projects on either side of the base of the rostrum, and the sides of the head are studded with tubercles. In the peræon the hinder margin of each segment is adorned all round with teeth alternating in size, the succession of large central teeth almost constituting a continuous carina, while on the other hand the transverse depressions at the base of each segment give the back, viewed laterally, an imbricated appearance. The fringing teeth vary in number from nine to seventeen, presenting an appearance like that of the projecting edges of the septa in many Corals. The seventh segment has a second row of teeth in advance of the hinder margin, the other segments having also some lateral tubercles in this position, and the lateral margins of the segments being fenced in, as it were, with long flattened tubercles. The first pleon-segment has a fringe of very small teeth, and in front of the row a large median tooth flanked by some small ones not in line; the second segment has a long central ridge with small teeth on its flanks, but none on the hind margin; the third segment, dorsally much longer, has the central ridge without other ornament, and in this respect is resembled by the three following segments, which are very small; the first three segments have the postero-lateral angles rounded.

The Eyes are long and narrow, separated only by a narrow carina, their outline on the outer side determined by the shape of the rostrum; the ocelli are numerous, and the colour remains dark after preservation in spirits for many years.

Upper Antennæ more slender than the lower; first joint narrowing distally, second shorter than the first, with a spine near the middle of the upper margin and one at the apex, also two feathered cilia at the apex below; the third joint only half as long as the second and much narrower; the flagellum broken off; the feebleness of the third joint of the peduncle is suggestive of a small flagellum, and the peduncle itself reaches little beyond the base of the fourth joint in the lower antennæ.

Lower Antennæ.—First joint but little expanded; a very small but distinct gland-cone at the lower basal part of the second joint, the two joints being at this part clearly distinguished, though at the upper part they are quite coalescent; the upper margin distally produced; the third joint nearly as broad as long; the fourth joint much narrower, but more than three times as long, carrying short spines and plumose cilia on various parts; the fifth joint rather more than twice as long as the third, narrower

than the fourth, armed like it; the flagellum broken, a small calceolus on the single remaining, somewhat elongated joint.

Upper Lip with a broad apical margin.

Mandibles powerful. The cutting plate at one end has three teeth, of which one is produced considerably beyond the other two; a flat oblique border leads from these to a small tooth at the other end; within the main plate in the left mandible is placed a secondary plate of similar shape, with its lower edge cut into five consecutive teeth, of which the outermost is produced much beyond the others; in the right mandible the secondary plate is much slighter and narrower, apically divided into two denticulate teeth; the spine-row consists of six or seven denticulate spines; the very prominent molar tubercle has its crown set with many rows of denticles; the seta at the upper corner is small; the long palp is inserted over the molar tubercle. The first joint short, the second long, narrowing distally, with some six groups of spines along its course; the slender third joint is almost as long as the second, fringed along almost all the inner edge with spines, and having three, of which two are very long, at the apex; near the base close to the hind margin are two, a long and a shorter one; all these spines being pectinate on two edges in the lower part.

Lower Lip.—The principal lobes rounded, very broad; the mandibular processes rather short, narrow at the apex.

First Maxillæ.—Inner plate very broad, the convex inner margin ciliated, the straight margin which follows at right angles with the convex part carrying five subequal plumose setæ at intervals; the outer plate narrower than the inner, the apical margin not very oblique, armed with nine long spines, four of which are strongly denticulate, the others at the apices strongly furcate; the palp reaching considerably beyond the outer plate, its first joint short, with some small setæ on the outer margin, the second long, having slender spines on the apex and upper part of inner margin, nine or ten in number, and half a dozen spaced along the serrate outer margin, and a row on the surface above near the inner margin.

Second Maxillæ.—The plates short and broad; the inner broader than the outer and reaching as far forward, its inner margin fringed with cilia, plumose setæ, and spines of various lengths, the fringe of spines passing but a little way round the broad apical border, which is not reached by the row of plumose setæ which passes inwards along the surface; the outer plate is fringed with spines round the upper part of its inner margin and the apical border, small spines passing down the upper part of the outer margin.

Maxillipeds.—The inner plates short, not nearly reaching the apex of the first joint of the palp, with slender teeth and curved spines on the flat-topped apex; the outer plates not broad, reaching halfway along the second joint of the palp, the inner margin concave, crowded with spines, the longest of which at the beginning of the apical border is followed by five plumose setæ; the first joint of the palp is less than half the length of the second;

the second is much expanded distally, fringed with setæ along the inner margin, and carrying some groups on the surface; the third joint expanded distally, is crowded, except near the base, with groups of serrate spines; the finger has its lower border prolonged a little beyond the base of the nail, carrying a cilium in the incision thus produced.

First Gnathopods.—Side-plates broader than deep, projecting much forwards, with much of the upper margin free, the front shorter than the hind margin, the front and lower both fringed with long setæ; perhaps homologically the upper is the front margin, the lower being bent round to take the place of the true front; the first joint reaching below the side-plate, channelled along the front, some groups of setæ on the inner surface and about the somewhat expanded distal portion; the second joint short; the third without any free front margin, the hinder carrying groups of setæ, and a little produced on the outside with setæ upon this apical process; the wrist longer than the third joint, with groups of setæ on the front margin and near the hind margin on the inner surface, the lower hinder part forming a large bent process, the border and inner surface of which are armed with spine-like setæ, this process giving the wrist the not uncommon cup-shape; the hand much longer than the wrist, broad, oval; the long palm, defined close to the apex of the wrist-process by two spines and bordered with numerous setæ, occupies the greater part of the hind margin; groups of setæ of different lengths are set upon the inner surface of the hand near each margin; the finger is strong, long, and curved to match the palm, its edges are smooth, except for the small dorsal cilium near the base.

Second Gnathopods.—Side-plates longer than broad, narrower than those of the preceding pair, fringed like all the others with setæ below. The limb in its details closely resembling the first pair, but with the joints somewhat longer, and the lower edge of the third joint fringed with strong unequal spines, which were not observed in the other gnathopods.

First Peræopods.—Side-plates a little broader than those of the preceding segment. Marsupial plates very long and fringed with numerous long setæ. First joint of the limb reaching beyond the side-plate, carrying setæ on both margins, on the serrate hinder margin several that are very long as well as some that are shorter; the second joint short; the rest of the limb broken off.

Second Peræopods.—The side-plates rather longer than the preceding pair, pretty deeply excavate behind, the setiferous lower margin running with a continuous curve up to the point at which the excavation ceases. The marsupial plates like those already described. The first joint of the limb reaching beyond the side-plate, resembling that of the first peræopods; the third joint about half the length of the first, not decurrent or scarcely so, carrying on the serrate hinder margin four or five groups of spines and setæ, and a group at the apex before and behind; the following joints broken off.

Third Peræopods.—The front lobe of the side-plates much larger than the hinder one. The branchial vesicles with a narrow neck, thence expanding rapidly with a triangular

form. The first joint but little expanded, much longer than broad, broadest near the base, hind margin nearly straight and smooth, front margin slightly curved and serrate, both closely fringed with setæ, of which many on the front margin are densely plumose; on the inner surface the inner margin of the unexpanded joint, as distinct from that of the wing or expansion of it, carries numerous setæ, some of which are densely plumose and of great length; the second joint very short, the third rather long, shorter than the first, crowded with long spines and plumose setæ on the front margin, and with plumose setæ on the hind margin; it expands a little from the narrow base and contracts towards the distal end. Remainder of the limb missing.

Fourth Peræopods.—Side-plates deeper behind than in front. First joint broader than in the preceding pair, but not longer, the upper part rounded behind; the armature and general structure of the limb similar to that of the third peræopods, but the third joint longer than the first, with some long spines at and near the apex in front, a suture or groove crossing the joint for half or more of its breadth a little way from the apex; the fourth joint much narrower and shorter than the third, with some short setæ and long spines on the front margin; the spines with curved ends, one of them equalling the length of the joint. Remainder of the limb missing.

Fifth Peræopods.—Side-plates with the upper margin produced to a small point. The first joint expanded, sloping away on both sides from the neck, the front margin very convex, fringed with small spine-like setæ, the hind margin sinuous, convex above, with longer setæ, and a small apical lobe set with spines not overlapping the second joint; the joint being much thickened where the chief muscles lie presents a surface depression along the hinder expansion; the second joint with its front and hind margins unusually free; the third joint narrower but not shorter than in the preceding pair, of almost uniform width throughout, the apex scarcely decurrent, eight groups of spines on the front margin, spines and setæ fringing the hinder margin. Remainder of the limb missing.

Pleopods.—The pair of coupling spines very small, the terminal hook bent sharply downwards; a lateral tooth at some distance below; there are many small retroverted teeth along the outer margin; such teeth I believe to be not uncommon, but as they do not project they are in many species very difficult to discern; the outer distal end of the peduncle produced into a curved tongue; the cleft spines forming a row of nine, those at the top short; the joints of the inner rami twenty, of the outer twenty-two in number.

Uropods.—The peduncles of the first pair longer than the inner ramus, closely fringed with spines on two edges, the rami narrow, stiliform, the inner with six spines along the upper margin, not beginning close to the base and not nearly reaching the acute apex; the outer ramus broken, with six spines on the upper part, stouter than those of the inner ramus; the peduncles of the second pair longer than the subequal stiliform rami, with a row of seta-like spines on the surface, with spines all along the lower edge and along more than the distal half of the upper; several spines along the edges of the

rami, but not extending to the apical region; peduncles of the third pair a little shorter than the lanceolate rami; with short slender spines on the outer margin, longer and stronger ones on the two inner edges; the inner ramus with eight spines of various lengths on its inner margin, and a row of eleven small ones on the outer, the outer ramus with five along the proximal half of the outer margin.

Telson short, rounded at the top, the greatest breadth near the base, the distal border broad, scarcely emarginate, slightly serrate at the outer corners, above which are placed on either side two pairs of cilia.

Length.—The length of the peræon and first three segments of the pleon united was exactly half an inch.

Locality.—Station 162, off East Moncœur Island, April 2, 1874; lat. 39° 10′ 30″ S., long. 146° 37′ 0″ E.; depth, 38 fathoms; bottom, sand and shells. Dredged. One specimen, female.

Remarks.—The specific name refers to the striking ornamentation of the peræon.

It long appeared to me that this species ought to be placed in the same genus with *Acanthostepheia malmgreni*, Goës, and *Acanthostepheia pulchra*, Miers, although the broken antennæ and peræopods left one or two of the characters in obscurity. But the two northern species just mentioned are both sharply distinguished from the present species by having small lateral eyes remote from the rostral apex, while the generic relationship between this and the other two species assigned to the new genus *Œdiceroides* seems to be consistently maintained in all parts; the inner plate of the first maxillæ has much the same shape in all three, although the number of setæ varies, being five in the present species, compared with three and eight respectively in the other two. In *Acanthostepheia malmgreni*, it may also be mentioned, the last three pairs of side-plates in the peræon are acuminate, but Miers does not seem to mention these in describing his species, so that it remains uncertain whether this should be regarded as a generic characteristic.

Incertæ sedis.

Genus *Amathillopsis*, Heller, 1875.

1875. *Amathillopsis*, Heller, Österr. Ungar. Nordpol-Exp., p. 11.
1876. „ Sars, Prodromus descr. Crust. Exp. Norv., p. 359.
1881. „ Miers, Ann. and Mag. Nat. Hist., ser. 5, vol. vii.
1883. „ Stebbing, Ann. and Mag. Nat. Hist., ser. 5, vol. xi. p. 205.
1885. „ Sars, Den norske Nordhavs-Exp., p. 181.
1886. „ Gerstaecker, Bronn's Klassen und Ordnungen, Bd. v. Abth. ii. p. 512.

For the account of this genus given by its author, see Note on Heller, 1875 (p. 442). Heller places it between *Amathilla* and *Gammaracanthus*, that is to say, in the group of

which Boeck constitutes the subfamily Gammarinæ, and there perhaps it ought to stand. It is excluded from the Œdiceridæ by the large size of the upper antennæ and the small size of the fifth peræopods, as well as by having an accessory flagellum, though a small one, on the upper antennæ. In the species here assigned to the genus the fifth peræopods are undetermined, being imperfect in our single specimen, the upper antennæ have an appendage which can only very doubtfully be regarded as an accessory flagellum, and the third joint of the mandibular palp is longer than the second, instead of shorter as in Heller's species. In placing the Challenger species next to *Œdiceroides ornata*, I was influenced by the similarity in the mandibles, maxillipeds, gnathopods, and telson, as well as in the palp of the first maxillæ, though, it must be allowed, the outer plates of those organs differ in the number of apical spines. On the other hand, the general structure of the body and the character of the peræopods, so far as observed, bring *Amathillopsis australis* near to the genus *Epimeria*, but the maxillipeds are an obstacle to including it in the family Epimeridæ. Owing to the imperfect condition of the fifth peræopods in the specimen, the generic position of our species is itself a little uncertain, so that a more accurate determination of its family must await more favourable circumstances.

Amathillopsis australis, Stebbing (Pl. LXV.).

1883. *Amathillopsis australis*, Stebbing, Ann. and Mag. Nat. Hist., ser. 5, vol. xi. p. 205.

Rostrum small, with the apex a little depressed, not projecting as far as the lateral processes of the head; these are narrow, apically almost pointed, grooved on the outer surface; the lower margin of the head carinate; a longitudinal groove sweeps round from that of the lateral process almost to the hind margin, another groove descending from it transversely to a little angled point in the lower margin. A carina traverses the centre of the back, leaving the rostrum smooth, and likewise a small piece at the base of each segment; along the head and first four segments of the peræon it is a mere raised line, though raised sufficiently to show a little undulation on a lateral view; on the three following segments of the peræon and the first three of the pleon it is prolonged into acute processes, successively larger, and each overlapping the next following segment, that on the third segment of the pleon having its lower edge, not as in the other cases continuous with the hinder margin of the segment, but originating a little in advance of it; on the fourth segment the carina is indicated beyond the dorsal depression, but does not reach the end of the segment, it traverses the fifth, and is just indicated at the end of the sixth segment. All the peræon-segments have on each side a dimple or oblique groove, and on the first three pleon-segments rather higher up there is an arched groove not dimpled, these three segments have the hinder borders sinuous, and at the postero-lateral angle the first rather tends to form a tooth than actually develops one; in the second

and third the tooth is well developed, larger in the second than in the third. The fourth pleon-segment is much longer than the two following; the fifth is shorter than the sixth; all three are dorsally emarginate. The integument of this handsome species is crustaceous.

Eyes not made out, perhaps indicated by a somewhat roughened tract on either side of the cephalic carina, but probably absent.

Upper Antennæ.—First joint longer than the head, with a linear, not very straight, carina along the top; the joint is robust, thicker at the base than distally; the second joint equal in length, but less thick; the third joint but little more than a third the length of the second, distally dilated, and at the lower corner carrying a strong, flat, incurved spine (which possibly represents an accessory flagellum); the flagellum with the first joint longer than the spine just mentioned, bearded; the following joints numerous, short, closely united, each carrying a small calceolus. The flagellum incomplete, the remaining portion, a little longer than the first joint of the peduncle, contained more than fifty joints.

Lower Antennæ less robust than the upper, with peduncles of about the same length; first joint a little dilated; gland-cone small; third joint subequal in length to the coalesced first and second; fourth joint rather longer than the first of the upper antennæ, carrying spines on three edges; the fifth armed like the fourth, shorter and thinner than that joint, longer than the first three united; the flagellum with a first joint longer than any of those which follow, these, as in the upper antennæ, being short, numerous, and each armed with a small calceolus. The flagellum incomplete, the remaining portion containing seventy joints, those towards the end being longer than those nearer the peduncle with the exception of the first, the whole equal in length to the first four joints of the peduncle. The calceolus is of a peculiar shape in this species; to the foot-stalk succeeds the usual circular cup, but the distal portion beyond this, instead of being as usual oval, has the distal half of each side cut away as it were, so as to leave a narrow triangular piece with the basal half of the oval projecting in a point on either side.

Upper Lip broad and thick, with a flattened space in the centre of an almost semicircular distal margin, the curve on either side of which has but few cilia.

Mandibles.—Cutting plate produced into a long process set round in front with eight or nine teeth, of which on the left mandible the lowest is the largest; the secondary plate on the left mandible has its edge divided into six teeth, of which the lowest is much the largest; on the right mandible the lowest but one of the teeth in the principal cutting plate is the largest, a circumstance not unusual; the secondary plate is less strong than in the other mandible, somewhat expanded distally, and divided into three teeth, of which the lowest is the longest and is subdivided into two small teeth; the spine-row shows ten spines on the left, nine on the right mandible, the

spines being to some extent denticulate or pectinate; the molar tubercle is prominent, with oval crown, dentate on one side, ciliated along the other edge; at the top in front a tubercular process and a ciliated ridge at right angles to the crown; there is a broadly oval process between the molar tubercle and the palp; on the outside from the basal part of the shaft, and parallel with it, projects a large, rectangular process, probably serving some interlocking purpose to adjust or strengthen the movements of the mandibles; the first joint of the palp has a group of spines at the outer distal angle; the second joint has the hinder margin concave, with spines along the convex front margin, except a short piece at the base, and a parallel row on the surface, many of the spines being very long and most of them pectinate on two edges; the third joint is narrow, tapering, longer than the first and second united, with pectinate spines of various lengths along almost the whole front margin, with groups also at the back and one on the surface near the base, also with closely-set cilia on the surface of the upper part.

Lower Lip.—The principal lobes broad and deep, and rather thick, strongly ciliated on the broad, rounded, distal margin, and more slightly on the straight inner margin; the mandibular processes with the apex directed a little outwards, the outer margin being broadly grooved, so that the process has a three-sided appearance.

First Maxillæ.—The inner plate oblong-oval, the attachment below narrow, the outer margin overlapping the outer plate; seven plumose setæ, commencing at the top of the inner margin, pass round half the broad, distal margin, the seventh arising on the surface a little within the margin; at the inner corner there are three setules; the outer plate, longer but scarcely broader than the inner, carries on the truncate distal margin eleven slightly curved spines, of which none seems to have more than two lateral denticles, most of them having only one; on one of the maxillæ there appeared to be twelve spines; the first joint of the palp is short, the second reaches beyond the outer plate, and carries round the apex and top of the inner margin seven long spine-teeth, the apex itself being serrate or rather cut into broad teeth; eight setiform spines pass along the surface from the outer apical angle a little way down the inner margin, within much the same limits a small thicket of cilia occupying the opposite surface; on the outer margin seta-like spines are placed at four serrations and at the apex.

Second Maxillæ.—The inner plate has its inner margin for some distance straight, strongly ciliated, at the widest part of the plate the margin turns obliquely towards the rounded apex, having at the turn several plumose setæ, numerous long and slender spines fringing the margin from this point round the apex; the outer plate is very little longer than the inner and scarcely so broad, both its front and hind margins concave below and convex above, the convex portions and the apex fringed with numerous spines, those on the apex very long, those on the outer margin small.

Maxillipeds.—The inner plates small, reaching little beyond the base of the first

joint of the palp, with groups of plumose setæ on or within the upper part of the inner margins, the distal margins broad, sloping outward, carrying two pairs of short teeth on one of the plates, on the other a pair of teeth and a tooth and a spine; these are followed by seven or eight long spines bending inwards; the outer plates narrow, reaching but little beyond the first joint of the palp, with the inner edge smooth for some distance, and then irregularly denticulate to the apex, which forms a tooth, beyond which the distal margin rises in a curve, set closely round with long curved spines to the number of fourteen or fifteen, which are successively longer and thinner, so that those which pass down the outer margin are rather feathered setæ than spines; there are several setiform spines on the surface within the inner margin; the first joint of the palp is short, its inner margin extremely so; the second joint is elongate, carrying on both surfaces near the inner margin numerous groups of spines, many of them long and pectinate on two or three edges; there is also a group at the middle, and at the apex, of the outer margin; the third joint is much longer than the first, and thickly set on both margins and at the apex with large groups of pectinate spines; the finger is long, curved, sharply pointed, longer than the first, but shorter than the third joint, with a small cilium at the nail, both edges and probably the whole joint covered with short down.

First Gnathopods.—The side-plate short, not overlapping the head, its front margin at the lower part sloping backwards, the lower margin a little concave, and the hinder sinuous, fringed with short spines. The first joint projecting much beyond the side-plate, not so long as the hand, its front margin nearly straight, the distal half of the hinder much out-bowed, and the whole fringed with setiform spines, and the lower margin, which at the rear projects beyond the second joint, also set round with spines, the front part of the inner surface covered with groups of setæ; the second joint short, like the first having its distal margin furnished with numerous setiform spines, some very long; the third joint irregularly oblong, no part of the convex front margin free, carrying a group of spines on the inner surface; there is also a bunch of spines near the apex of the hind margin, which itself is embowered in spines rising on the surface near it; the wrist large, about as long as the first joint, the wing widening distally, but not reaching so far as the front margin of the joint, thickly set round with long serrate spines, besides having numerous groups of them on the inner surface, supported by other groups near the front margin on both surfaces, the lower margin of the wing concave and channelled near the attachment of the hand: the hand a very elongate oval, broadest about the centre, nowhere so wide as the wrist at its widest, and abruptly narrowed at the hinge of the finger, with many groups of spines or setæ on the inner surface near each margin; the palm includes without any precise definition almost the whole of the hind margin, and is armed as well with long and short serrate setiform spines as with several short stout spines, for the insertion of all which a

special crenulation is provided just within the palm-margin; the finger is long and curved to fit the palm; by the bending forward of the hand in the channelling of the wrist the finger would be enabled to touch the expanded portion of the wrist, which may thus be adapted to assist in the act of grasping; the dorsal cilium close to the hinge, minute.

Second Gnathopods.—Side-plates larger and deeper than those of the first gnathopods, similar, except that the front margin has no abrupt bend. Branchial vesicles with a narrow crumpled neck, the whole length about equal to that of the first joint. The marsupial plates narrowing distally, set closely round with very numerous and long setæ, more closely on the front than on the hind margin. The limb closely resembling that of the preceding pair in shape and the details of its armature, but the first joint considerably longer and more out-bowed on the hind margin, the wrist shorter than the first joint, its wing, unlike that in the first gnathopods, produced beyond the front margin so as to form a calx, though not a long one; the hand and finger but little longer than in the preceding pair; in each pair the finger has some small stiff hairs on the inner margin.

First Peræopods.—Side-plates with the front margin nearly straight, descending considerably below the preceding pair and free from it except at the convex upper part of the margin; the short slightly emarginate lower border makes a sharp angle with the front; the plate is thickened and its surface almost rigid near the hind margin, which is overlapped by the following plate. The branchial vesicles, of tolerably even width to the rounded apex, are longer than the first joint of the limb. The first joint reaches much below the side-plate, about equals the length of that of the preceding pair, with similar armature and a slight tendency to the out-bowing of the hinder margin, which forms a ridge; the second joint with two groups of spines on the hind margin; the third joint elongate, not quite so long as the first, narrow, slightly curved, a very little expanded and decurrent at the distal end, with spines at some seven points of the hind margin, and some spinules in front; the remainder of the limb missing, unfortunately, not only in this but in all the peræopods.

Second Peræopods.—The side-plates shorter than in the preceding pair, excavated behind for little more than a quarter of the depth, from the angle of the excavation the margin slanting forwards to form a sharp angle with the lower point of the sinuous front margin. The branchial vesicles, marsupial plates, and joints of the limb as in the preceding pair.

Third Peræopods.—The side-plates broader than deep, the front lobe larger than the hinder, the hinder with its lower margin flattened. Branchial vesicles broader than in the preceding pairs; marsupial plates similar. First joint of the limb rather longer than in the preceding pairs, a little expanded behind near the base, and distally in front, the armature slight, both front and hind margins carinate; the third joint similar to that of

the preceding pair, but rather shorter, with six groups of strong spines on the front margin.

Fourth Peræopods.—The front margin of the side-plates almost straight, shorter than the hind margin, the lobe behind resembling that in the third peræopods. The first joint rather shorter than in the preceding pair, but more dilated behind near the base; the limb in other respects like the preceding.

Fifth Peræopods.—Side-plates small, not bilobed. First joint shorter than in the preceding pair, more expanded above, other details similar.

Pleopods.—The coupling-spines with two lateral retroverted teeth, the apical tooth seemingly double, bent, but not downwards; the cleft spines on the first pair nine in number, with seven or eight plumose setæ on the margin above them, and as many on the same joint below them; the joints of the outer ramus thirty-eight, of the inner thirty-four; the peduncles carrying numerous setæ.

Uropods.—The peduncles of the second pair reach back just beyond those of the first pair, and those of the third just beyond those of the second; the peduncles of the first pair longer than the rami, the rami lanceolate, the outer a little shorter than the inner, which it partially clasps, the marginal spines small; the peduncles of the second pair rather shorter than the longer ramus, the rami similar to those of the preceding pair, but reaching rather beyond both those and the third pair; the peduncles of the third pair much shorter than the rami, which, as in the other pairs, are broad, lanceolate, the outer shorter than the inner.

Telson subequal in length to the peduncles of the third uropods by which it is closely clasped, longer than broad, slightly narrowing distally, the distal end slightly emarginate.

Length.—The specimen is figured life-size at the top of the Plate. From the lateral lobe of the head to the dorsal apex of the first pleon-segment is nine-tenths of an inch; the total length without the antennæ may be considered to be an inch and a half, the imperfect upper antennæ measure seven-tenths of an inch.

Locality.—Station 184, between Australia and New Guinea, August 29, 1874; lat. 12° 8′ S., long. 145° 10′ E.; depth, 1400 fathoms; bottom, Globigerina ooze; bottom temperature, 36°. One specimen, female. Trawled.

Remarks.—The specific name refers to the great distance between the habitat of the present species and that of the two earlier known species of the same genus, which are both Arctic. From the type-species, *Amathillopsis spinigera*, Heller, the present is distinguished by the palp of the mandibles, which in Heller's species has the third joint shorter than the second, by the absence of dorsal processes on the first four segments of the peræon, and the fourth of the pleon, by the shape of the side-plates, and by the peduncles of the third uropods, which in Heller's species are double the length of the telson. From *Amathillopsis affinis*, Miers, it is distinguished by the absence of dorsal

processes on the anterior peræon-segments, by the different shape of the gnathopods, and other particulars.

Heller places the genus between *Amathilla* and *Gammaracanthus*, apparently therefore, as already observed, including it in the subfamily Gammarinæ as defined by Boeck, but with Boeck's definition it does not well agree either in regard to the first maxillæ, the spines of which are neither furcate nor serrate, while both the palps are similarly not differently armed, or in regard to the maxillipeds, in which the inner plates are small, not elongate, or in regard to the peræopods, of which the three last pairs, according to Heller, successively decrease in length, instead of increasing in accordance with the definition. The objections are of less importance which may be urged against affiliating this genus to Boeck's subfamily Epimerinæ.

Genus *Zaramilla*, n. gen.

Antennæ short.

The Upper Lip distally rounded.

Mandibles with strongly dentate cutting plates; a secondary plate on each mandible; several denticulate spines in the spine-row; the molar tubercle prominent; the palp three-jointed, the second and third joints large.

The Lower Lip broad.

First Maxillæ.—The inner plate with many plumose setæ.

Second Maxillæ.—The inner plate with many plumose setæ on or near the inner margin; the outer plate rather longer and broader than the inner.

Maxillipeds.—The outer plates with spine-teeth on the inner margin; the second joint of the palp long, the fourth slender and acute.

The First and *Second Gnathopods* similar, subchelate, the wrist subequal in length to the hand.

The third joint large in all the *Peræopods*, in the last three pairs remarkably developed; the fingers of the peræopods having a little cap over the point of the nail.

The Uropods biramous, the rami equal in the first and third pairs, the outer branch the smaller in the second pair.

The Telson not very elongate, deeply cleft.

The generic name is taken from an imaginary personage in Don Quixote.

The genus, in regard to the head, antennæ, gnathopods, and pleon, would reasonably be arranged among the Atylidæ, while the peræopods, except the last pair, and in some respects the mouth-organs, would bring it near to the Œdiceridæ. From the Pontoporeiidæ it is separated by the absence of the secondary flagellum from the upper antennæ.

Zaramilla kergueleni, n. sp. (Pl. LXVI.).

Back round, not broad, the animal compressed; head a little angularly advanced between the upper antennæ, medio-lateral lobes but little advanced; postero-lateral angles of the first two pleon-segments acute, of the third, which is the longest, right-angled.

Eyes large, dark, oval, placed near the front margin, with no great interval on the top of the head.

Upper Antennæ.—The peduncle as long as the flagellum, the first joint much thicker and somewhat longer than the second, which is thicker and longer than the third, all three with setæ on the lower margin; the third as long as the first three or four joints of the eleven- or twelve-jointed flagellum; on some of the joints of the flagellum, besides setæ, were long and broad cylinders, and also short ones, in the male also calceoli.

Lower Antennæ.—First joint little expanded, gland-cone small and little prominent, third joint very short; fourth joint broader, but a little shorter, than the fifth, both these with setæ on the lower margin; flagellum of fourteen joints, for the most part longer and shorter alternately, the longer being also more expanded distally, and, in the male, carrying small calceoli.

Upper Lip very broad, the distal margin rather irregularly convex; in the specimen figured this is folded back, probably by accident.

Mandibles.—Cutting edge divided into five or six strong teeth; the secondary plate on the left mandible similarly divided; on the right mandible the cutting edge does not seem to antagonize squarely with that of the left mandible, its secondary plate is of much slighter construction, by no means as on the other mandible a reduced duplicate of the cutting edge, but laminar, the apex divided into two portions, each with a gaping, serrate emargination, so that four terminal teeth are formed, of which the central two overlap; the spine-row of numerous, seven or more, long, curved, pectinate spines; the molar tubercle prominent, with denticulate crown; the palp set well forward, just over the molar tubercle, the first joint short, the second rather longer than the third, fringed for the greater part of its length on and near the inner margin with slightly plumose setæ, the third joint a long oval, pointed at the apex, fringed like the second, and also carrying on the outer surface, near the base, a transverse row of eight setæ of various sizes; an articular process stands out between the molar tubercle and the base of the palp.

Lower Lip short but very broad, forward lobes little dehiscent, the broad apical and inner margins well ciliated; inner plates faintly distinct.

First Maxillæ.—Inner plate broad, narrowing to the apex, fringed with a dozen plumose setæ, of which the apical is the longest; outer plate carrying on the apical margin nine multidentate spines, of which the innermost is straight; the large second

joint of the palp overtops the outer plate, and has a small spine-tooth below the apex, and a row of six on the apex, the outermost being longer and more slender than the rest; a row of small setæ runs below the apical margin.

Second Maxillæ.—The plates moderately broad, with rounded apices; the inner plate a little shorter and narrower than the outer, with ten or a dozen plumose setæ, beginning on the inner margin near the base and passing round towards the outer apex; the apical margin fringed with rows of curved spines; the apical margin of the outer plate fringed in like manner, the largest spines outermost, followed by a few smaller ones down the outer margin.

Maxillipeds.—Inner plates reaching about as far as the apex of the first joint of the palp, apical margin straight, with three spine-teeth and a row of plumose setæ beginning below the apex on the inner side, passing along it and ending just below it on the outer side, some long plumose setæ on the inner margin; outer plates small, not nearly reaching the end of the second joint of the palp, with eight long spine-teeth on the inner margin, followed by a longer spine-tooth and five plumose setæ round the apical, and a little descending the hinder, margin; there are also numerous groups of setæ on the outer surface, within the inner margin of the plates; the second joint of the palp longer than the first; the third as long as the first, with setæ on surface and apex, some of the latter strongly pectinate; finger slender, with a sharp nail.

First Gnathopods.—Side-plates oblong, rounded lower margin fringed with setæ, two or three of which also occur on the hind margin. The first joint reaching a little below the side-plate, with some setæ along the hinder, and two or three near the base on the front margin, some pectinate spines at the apex behind; the third joint short, with pointed apex, just above which is a row of setæ and a pectinate spine; the wrist in the male a little shorter, in the female a little longer, and distally a little broader, than the hand, with rows of pectinate spines on the hinder margin and the surfaces near it, a group of setæ at the front apex; the hand between oval and oblong, with groups of seta-like pectinate spines on both surfaces and near both margins; the palm oblique, a little sinuous, minutely crenate, bordered with cilia, defined by a group of stout but slenderly pointed spines of various sizes, the smallest outermost; the finger reaching just to the extremity of the palm, with a little constriction of the outer margin at the base of the nail; the dorsal cilium short.

Second Gnathopods.—Side-plates a little longer and broader than those of the preceding segment, otherwise similar. The branchial vesicles a long oval, longer than the first joint of the limb; the marsupial plates in the female specimen figured were short, oval, smooth-rimmed. The joints of the limb scarcely differ from those of the first pair, the first joint longer, and descending further below the side-plate, the hand considerably longer in the male, and a little longer in the female, than the wrist; armature practically identical.

First Peræopods.—Side-plates similar to the preceding pair. Branchial vesicles expanding from a narrow neck so as to be widest distally, as long as the first joint, and almost as wide as long. First joint extending a little below the side-plate, second joint very short, third longer than fourth or fifth, with some setæ on the hind margin and apex of front; fourth a little longer and much broader than fifth, with setæ on both margins; fifth not broad and not tapering, with setæ on both margins, those on the straight hind margin short; the finger very short, with short cilia near the hinge and near the nail; the nail with a pointed projecting cap.

Second Peræopods.—Side-plates not much longer but very much broader than the preceding pair, the excavation behind descending a very small distance. The first joint not reaching the end of the side-plate, the limb in other respects scarcely differing from the preceding pair.

Third Peræopods.—Side-plates broad but not deep, the hind lobe less broad than the front, of about the same depth, crenulate and ciliated round the lower part of its hind margin. The first joint large, oblong, oval, rather broader below than above, with small setæ in the crenulation of the hind rim, and longer setæ on the front margin; second joint very small; third of great size, nearly as long as the first joint, much broader than the fourth, somewhat decurrent, with setæ, some of which are spiniform, along both margins; the fourth joint longer and much broader than the fifth, with setæ on both margins; the fifth not so long as the straight, slender finger, with setæ on both margins, and at the front apex close to the hinge of the finger a group of spines, two short and stout, and a third half the length of the finger, of great strength; the finger tapering, minutely pectinate in front, the nail spine-like, with a cilium at its base, and sheltered by a long cap, the peak of which projects beyond it.

Fourth Peræopods.—The hind lobe of the side-plates produced much below the front one. The first joint more rounded than in the preceding pair, rather broader, but rather shorter, especially behind; the other joints similar but longer, the third and fourth also wider, the third more strongly armed with spines.

Fifth Peræopods.—Side-plates small, not bilobed. Branchial vesicles small, ovate, a little larger than the side-plates. First joint broader and behind much longer than that of the preceding pair; the third joint large, broad, and strongly spined; fourth joint longer than in the preceding pairs, with spines as well as setæ on the front margin; the fifth joint equal in length to the finger, the dorsal cilium of which in this, as in the two preceding pairs, is very small.

Pleopods.—Groups of setæ on the peduncles, two hooked spines both apically sharp, one with three, the other with two retroverted teeth, the opposite margins with backward serrature; the rami with fourteen joints to the inner, sixteen to the outer; the first joint of the inner with three cleft spines at the upper part, some plumose setæ below, and groups of setæ on the opposite margin.

Uropods.—Peduncles of the first pair longer than the rami; the rami subequal, each with three spines on the margin, and at some distance from these a large terminal one at the apex, surrounded by three shorter ones; the peduncles of the second pair shorter than one ramus, longer than the other; this pair is shorter but stouter than the preceding, very similar in armature, but the longer ramus has four marginal spines; the peduncles of the third pair much shorter than the rami, which are lanceolate, subequal, with spines on both edges, and some on the surface, some of the spines being in pairs.

Telson as long as once and a half the breadth at the base, extending beyond the peduncles of the third uropods, cleft for three-quarters of its length, only dehiscent near the end, the two halves apically pointed; pairs of unequal spines at three points on the surface of each half, seemingly not quite symmetrically placed, also a couple of cilia midway down between the upper and next pair of spines.

Length.—The length of the female specimen in the position figured, from the front of the head to the back of the third pleon-segment, was three-tenths of an inch.

Locality.—Kerguelen, January 14, 1874; at the surface. Several specimens.

Remark.—The specific name refers to the place of capture.

Family Pleustidæ.

For the characteristics of the subfamily Pleustinæ, in which Buchholz places the genera *Pleustes* and *Parapleustes*, see Note on Buchholz, 1873 (p. 424); in changing the subfamily into a family I propose to omit from the definition the statement that the mandibles have no molar tubercle.

Genus *Pleustes*, Spence Bate, 1858.

1858. *Pleustes*, Spence Bate, Ann. and Mag. Nat. Hist., ser. 3, vol. i. p. 362.
1859. *Paramphithoë* (*pars*), Bruzelius, Skand. Amph. Gamm., p. 68.
1860. „ „ Boeck, Forh. ved de Skand. Naturf. 8de Møde, p. 662.
1862. *Pleustes*, Spence Bate, Brit. Mus. Catal. Amph. Crust., p. 61.
1865. *Paramphithoë* (*pars*), Goës, Crust. amph. maris Spetsb., p. 7.
1866. *Pleustes*, Lilljeborg, On the Lysianassa magellanica, p. 18.
1870. *Paramphithoë*, Boeck, Crust. Amph. bor. et arct., p. 95.
1874. *Pleustes*, Buchholz, Die zweite Deutsche Nordpolarfahrt.
1876. „ Boeck, De Skand. og Arkt. Amph., pp. 299, 496.
1884. „ Schneider, Crust. og Pycn. Kvænangsfjorden, p. 97.
1886. „ Gerstaecker, Bronn's Klassen und Ordnungen, Bd. v. Abth. ii. p. 503.

Sars, who in 1876 named a species *Pleustes euacanthus*, in 1885 re-named this species *Paramphithoë euacantha*, and takes occasion to remark that he considers that the genus

Paramphithoë should be classed among the Epimeridæ, and that he has "seen fit to retain Spence Bate's genus *Pleustes* for *P. panopla*, Kröyer, and the species nearest related to that form." He does not, however, say whether he places *Pleustes* also in the family Epimeridæ. For the original definition of the genus, see Note on Spence Bate, 1858 (p. 308). Boeck gives the following more expanded description :—

"*Upper Lip* deeply cleft.

"*Mandibles* unlike one another; one with, the other without, an accessory plate; the third joint of the palp almost equalling the second in length.

"*First Maxillæ* having the outer plate furnished with slender spines, some of them serrate on the inner margin, some apically furcate; the palp apically furnished with spines; the inner plate small, with few setæ.

"*Maxillipeds* with the inner plate short but broad; the outer plate small, with slender spines on the inner margin; the palp elongate, its last joint forming a long nail, serrate on the inner margin.

"*Upper Antennæ* longer than the lower.

"First four pairs of side-plates large or of moderate length and successively larger.

"Head produced into a frontal rostrum, which is generally strong.

"*First* and *Second Gnathopods* more or less robust, of nearly the same shape; the wrist short, sending out a small heel from the lower hinder angle.

"*Uropods* with the outer ramus shorter than the inner.

"*Telson* small, undivided."

To this he appends the remark in brackets, that "the genus *Pleustes* can scarcely be included in the Oedicerinæ." Accordingly, at p. 496 of the work just quoted, he places the genus *Pleustes* among the Leucothoinæ, the sixth subfamily of the Leucothoidæ, without, however, noticing that his definition of this subfamily disagrees in some respects with his generic definition of *Pleustes*. Thus, in describing the side-plates of the Leucothoinæ, he says, "1mo majore qvam 2do et 3tio," of the uropods he says, "ramis ultimi paris longitudine fere æqualibus," and of the telson, "appendix caudalis elongata."

The new species here assigned to the genus differs from Boeck's generic account in having a secondary plate on each mandible, and in having the third joint of the mandibular palp longer than the second, in that particular, however, agreeing with Boeck's own, as well as Schneider's, specific account of *Pleustes panoplus*, Krøyer.

Pleustes panopla, Krøyer (sp.).

1883. *Amphithoë panopla*, Krøyer, Grønlands Amphipoder, p. 270, tab. ii. fig. 9.
1840. „ „ Milne-Edwards, Hist. des Crust., vol. iii. p. 41.
1846. „ „ Krøyer, Voy. en Scand., pl. xi. fig. 2, *a–x*.
1858. *Pleustes tuberculatus*, Sp. Bate, Ann. and Mag. Nat. Hist., ser. 3, vol. i. p. 362.
1859. *Amphithoë panopla ?* (*panoploides*), M. Sars, Oversigt norsk-arct. Krebsdyr.
1859. *Paramphithoë panopla*, Bruzelius, Skand. Amph. Gamm., p. 69.
1862. *Pleustes tuberculatus*, Sp. Bate, Brit. Mus. Catal. Amph. Crust., p. 62, pl. ix. fig. 8.
1862. „ *panoplus*, Sp. Bate, Brit. Mus. Catal. Amph. Crust., p. 63, pl. ix. fig. 9.
1865. *Paramphithoë panopla*, Goës, Crust. amph. maris Spetsb., p. 7.
1870. „ „ Boeck, Crust. amph. bor. et arct., p. 96.
1874. *Pleustes panoplus*, Buchholz, Die zweite deutsche Nordpolarfahrt, Bd. ii. p. 334, Taf. vi.
1876. „ „ Boeck, De Skand. og Arkt. Amph., p. 302, pl. xxi. fig. 2.
1882. „ „ Hoek, Die Crust. der Fahrten des "Willem Barents," p. 52.
1884. „ „ Schneider, Crust. og Pycn. Kvænangsfjorden, p. 97.
1885. *Pleustes panopla*, G. O. Sars, Den norske Nordhavs-Exp., p. 168.
1886. *Pleustes panoplus*, Koelbel, Crust. Pycn. und Arachn. von Jan Mayen, p. 7.

Locality.—Station 49, south of Halifax, Nova Scotia, May 20, 1873; lat. 43° 3′ N., long. 63° 39′ W.; depth, 85 fathoms; bottom, gravel, stones; bottom temperature, 35°. One specimen. Dredged.

Remark.—It may be noticed that in this specimen the rostrum is proportionally longer than in the figures of the species given by Krøyer, Boeck, and Sp. Bate. J. S. Schneider observes that Boeck in his figure of the maxillipeds makes the first joint of the palp too long, and produces the outer plate to the middle of the palp's second joint, whereas in reality it only reaches the base. The Challenger specimen agrees very well with Krøyer's figures, but it seems scarcely possible that the figure of *Pleustes tuberculatus* in the British Museum Catalogue can represent the same species. Boeck, in speaking of the tuberculated form for which Professor M. Sars suggested the name *panoploides*, declares that the apparent difference between the Norwegian and Greenland specimens rests only on an oversight of Krøyer's. The matter seems to need some further investigation.

Pleustes abyssorum, n. sp. (Pl. LXVII.).

Rostrum long and narrow, carinate underneath, and channelled on either side of the carina, projecting over the first joint of the upper antennæ almost to its distal end, lateral lobes of the head very small, acute; all the segments of the peræon and pleon carinate, except the fourth of the pleon; the back has an imbricated appearance, the hind margin of the second segment of the pleon in especial being dorsally raised above the next segment; the third segment of the pleon has a dorsal dentiform process erect near the distal end; the fourth segment has a dorsal depression; the postero-lateral angle of the third is produced in a small point; in the two preceding segments this angle is not produced.